

3  
No. 2759

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United States  
Circuit Court of Appeals

For the Ninth Circuit.

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COLUMBIA GRAPHOPHONE COMPANY, a Corporation,

Appellant,

vs.

SEARCHLIGHT HORN COMPANY, a Corporation,

Appellee.

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VOLUME IV.

Transcript of Record.

(Pages 955 to 1190, Inclusive.)

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Upon Appeal from the United States District Court for the  
Northern District of California, Second Division.

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Filed

MAY 31 1910

F. D. Monckton,  
Clerk.

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United States  
Circuit Court of Appeals  
For the Ninth Circuit.

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[Clerk's Note: When deemed likely to be of an important nature, errors or doubtful matters appearing in the original certified record are printed literally in italic; and, likewise, cancelled matter appearing in the original certified record is printed and cancelled herein accordingly. When possible, an omission from the text is indicated by printing in italic the two words between which the omission seems to occur. Title heads inserted by the Clerk are enclosed within brackets.]

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At a stated term, to wit, the October Term, A. D. 1915, of the United States Circuit Court of Appeals for the Ninth Circuit, held in the courtroom thereof, in the City and County of San Francisco, in the State of California, on Wednesday, the twenty-ninth day of March, in the year of our Lord one thousand, nine hundred and sixteen. Present: The Honorable WILLIAM B. GILBERT, Senior Circuit Judge, Presiding; Honorable ERSKINE M. ROSS, Circuit Judge; Honorable WILLIAM W. MORROW, Circuit Judge.

No. 2759.

COLUMBIA GRAPHOPHONE COMPANY, a Corporation,

Appellant,

vs.

SEARCHLIGHT HORN COMPANY, a Corporation,

Appellee.

**Order Directing That Notice of Motion to Vacate Order of District Court Suspending and Staying Proceedings or in Default Thereof to Increase the Amount of Bond, etc., be Certified to This Court and Printed as a Part of the Transcript of Record on Appeal.**

Upon motion of Mr. Charles E. Townsend, counsel for the appellant in the above-entitled cause, it is ORDERED that the Notice of Motion to Vacate Order of District Court Suspending and Staying

*In the District Court of the United States for the  
Northern District of California, Second Division.*

IN EQUITY—No. 30.

SEARCHLIGHT HORN COMPANY,

Plaintiff,

vs.

COLUMBIA GRAPHOPHONE COMPANY,

Defendant.

**Affidavit of John H. Miller on Motion to Vacate  
Order Staying Proceedings, etc.**

State of California,

City and County of San Francisco,—ss.

John H. Miller, being duly sworn, deposes and says:

I am the attorney for plaintiff in the above-entitled suit.

Recently I caused an estimate to be made by competent parties in the East for the purpose of ascertaining approximately the number of infringing horns sold by the Columbia Graphophone Company and which would be subject to the accounting in this case. I have received written advices from these parties in the East, who report to me that a careful investigation indicates with a reasonable degree of certainty that the Columbia Graphophone Company has sold approximately one million one hundred thousand (1,100,000) of such infringing horns and for which they will be liable on the accounting.



While this statement is only an estimate, nevertheless I am informed that it is based upon reasonably reliable information, and I believe that it is approximately correct. In the Sherman, Clay & Company law action, the jury estimated the damages on the basis of fifty cents per horn, and in several licenses which the Searchlight Horn Company has issued since this litigation commenced a royalty of thirty-five cents per horn has been charged and paid. Upon the accounting herein I shall demand by way of damages fifty cents per horn, so far as the horns themselves are concerned together with additional items of damages caused by the infringement which have not yet been definitely fixed and which I shall shortly endeavor to fix and put in such shape as to present the matter before the Master.

As regards the profits of the defendant which will have to be accounted for, that I propose to prove by an examination of the books of the defendant. In view of these facts it is apparent that the bond for \$1,000.00 given by the defendant to suspend and stay all further proceedings in this Court until the determination of the appeal from the Interlocutory Decree, is wholly and utterly insufficient if its effect is to suspend the accounting. In order to justify the Court in an order suspending the accounting pending this appeal, I claim that a bond in the sum of no less than \$500,000.00 should be required.

JOHN H. MILLER.

Subscribed and sworn to before me this 13th day of January, 1916.

[Seal]                    GENEVIEVE S. DONELIN,  
Notary Public in and for the City and County of  
San Francisco, State of California.

Service of the within notice of motion to vacate order suspending and staying proceedings or in default thereof to increase the amount of the bond and affidavit of John H. Miller admitted this 13th day of January, A. D. 1916.

CHAS. E. TOWNSEND,  
For Defendant.

[Endorsed]: Filed Jan. 14, 1916. W. B. Maling,  
Clerk. By J. A. Schaertzer, Deputy Clerk.

---

*In the District Court of the United States for the  
Northern District of California, Second Division.*

IN EQUITY—No. 30.

SEARCHLIGHT HORN COMPANY,  
Plaintiff,

vs.

COLUMBIA GRAPHOPHONE COMPANY,  
Defendant.

**Notice of Motion to Vacate Order Staying  
Proceedings.**

To Charles E. Townsend, Esq., Attorney for Defendant:  
ant:

Take notice that on Monday, January 31, 1916, at ten o'clock A. M., or as soon thereafter as counsel



can be heard, plaintiff will move the above-entitled court at the courtroom thereof in the City and County of San Francisco, State of California, to set aside, vacate, and annul the order heretofore made by the Court on December 31, 1915, to the effect that upon defendant filing a bond in the sum of One Thousand Dollars further proceedings in this case be suspended and stayed until the determination of the appeal from the interlocutory decree, and also to vacate and set aside the amended order made in said case on January 18, 1916, providing that upon the defendant filing a bond in the sum of Five Thousand Dollars all further proceedings in the lower court be suspended and stayed until the determination of the appeal from the interlocutory decree:

The grounds of this motion will be as follows:

1. That the said two bonds filed by the defendant are not, nor is either of them, framed in such language or on such conditions as to protect and indemnify plaintiff against the damages it may suffer by reason of the suspension, stay and supersedeas of the order.

2. That said bonds are not, nor is either of them, conditioned as required by law for supersedeas bonds.

3. That both of said bonds are improperly executed and are not in such form as to operate as valid bonds for the following reasons:

- (a) They purport to be signed on behalf of the Principal—Columbia Graphophone Company—through and by “F. A. Dennison, District Manager,” but it does not appear that said F. A. Denni-

son as district manager had any authority to execute such bonds or to bind his principal thereby, nor is there any verification, justification or acknowledgment by said Dennison before an officer authorized to administer oaths; nor is there any corporate seal of the Columbia Graphophone Company attached; nor is there any showing that the Columbia Graphophone Company is a corporation.

(b) Said bonds purport to be signed on behalf of the surety, the Aetna Accident & Liability Company, through and by "G. S. Stuart, Resident Vice-President, and W. P. Barr, Resident Asst. Secretary"; but it does not appear that the said Stuart as resident vice-president and W. P. Barr as resident assistant secretary, had any authority to execute such bond or to bind their principals thereby; nor is there any verification or justification or acknowledgment by said Stuart and Barr, or either of them before an officer authorized to administer oaths.

4. No such bond has been executed by the defendant as is required by the rules of the Court of Appeals on appeals from an interlocutory decree granting an injunction.

On the hearing plaintiff will use, read and refer to the papers and pleadings on file and the bonds aforesaid.

Yours, etc.,

JOHN H. MILLER,

Attorney for Plaintiff.

Dated January 25, 1916.

Service of the within Notice of Motion admitted  
this 25th day of January, A. D. 1916.

CHAS. E. TOWNSEND,

Attorney for Defendant.

[Endorsed]: Filed Jan. 26, 1916. W. B. Maling,  
Clerk. By J. A. Schaertzer, Deputy Clerk.

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At a stated term to wit, the March Term, A. D. 1916,  
of the District Court of the United States of  
America, in and for the Northern District of  
California, Second Division, held at the court-  
room in the City and County of San Francisco,  
on Monday, the 6th day of March, in the year  
of our Lord one thousand nine hundred and six-  
teen. Present: The Honorable WILLIAM  
C. VAN FLEET, District Judge.

No. 30—EQUITY.

SEARCHLIGHT HORN COMPANY

vs.

COLUMBIA GRAPHOPHONE CO.

Plaintiff's motion to vacate order for stay of  
proceedings, heretofore heard and submitted, being  
now fully considered and the Court having rendered  
its oral opinion, it is ordered that said motion be and  
the same is hereby denied.

No. 30—EQUITY.

SEARCHLIGHT HORN COMPANY

vs.

COLUMBIA GRAPHOPHONE COMPANY.

United States of America,  
Northern District of California,  
City and County of San Francisco,—ss.

I, Walter B. Maling, Clerk of the District Court of the United States of America, in and for the Northern District of California, do hereby certify the foregoing to be a full, true and correct copy of the original notice of motion to vacate order suspending and staying proceedings or in default thereof to increase the amount of bond filed January 14, 1916; Notice of motion to vacate order staying proceedings filed January 26, 1916; and order denying plaintiff's motion to vacate order for stay of proceedings made March 6, 1916, in the above-entitled cause, as the same remains of record and on file in the office of the Clerk of said Court.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said District Court this 30th day of March, A. D. 1916.

[Seal]                      WALTER B. MALING,  
Clerk of the United States District Court, Northern District of California.

By J. A. Schaertzer,  
Deputy Clerk.

[Ten Cent U. S. Internal Revenue Stamp. Canceled March 30, 1916. J. A. S.]

[Endorsed]: No. 2759. United States Circuit Court of Appeals for the Ninth Circuit. Order Directing that Notice of Motion to Vacate Order of District Court Suspending and Staying Proceedings or in Default Thereof to Increase the Amount

of Bond, etc. Filed Mar. 30, 1916. F. D. Monckton, Clerk.

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*In the United States Circuit Court of Appeals, for  
the Ninth Circuit, Northern District of Cali-  
fornia.*

No. 2759—IN EQUITY.

COLUMBIA GRAPHOPHONE COMPANY (a  
Corporation),

Appellant,

vs.

SEARCHLIGHT HORN COMPANY (a Corpora-  
tion),

Appellee.

**Stipulation as to Printing Patents in the Record.**

It is hereby stipulated and agreed between the parties hereto, that the following patents, and only the following, need be printed or bound into the record:

Cairns—#10,235—Sept. 11, 1877 (Design)

McVeety & Ford—#34,907—Aug. 6, 1901 (Design)

Hart—#409,196—Aug. 20, 1889 (Patent)

Gersdorff—#453,798—June 9, 1891 (Patent)

Gersdorff—#491,421—February 7, 1893 (Patent)

Berliner—#534,543—Feb. 19, 1895 (Patent)

Myers—#647,147—April 10, 1900 (Patent)

Runge—#692,363—Feb. 4, 1902 (Patent)

McVeety & Ford—#699,928—May 13, 1902 (Patent)

Villy—#739,954—Sept. 29, 1903 (Patent)

Schoettel—#769,410—Sept. 6, 1904 (Patent)

Villy—#12,442—Jan. 30, 1906 (Reissue)



- Porter—#648,994—May 8, 1900 (Reissue)  
Kaiser (Trademark)—#31,772—July 5, 1898  
French Patent to Eugene Turpin—#318,742—Feb.  
17, 1902  
Sheble—#759,639—May 10, 1904 (Patent)  
Nielsen—#771,441—Oct. 4, 1904 (Patent)  
Eichorn—#797,725—Aug. 22, 1905 (Patent)  
Cunnins—#921,676—May 18, 1909 (Reissue)  
Berner—#926,235—June 29, 1909 (Reissue)  
Senne—#811,877—Feb. 6, 1906 (Reissue)  
Fernan—#829,066—Aug. 21, 1906 (Reissue)  
Benjamin—#917,404—April 6, 1909 (Reissue)  
Davis—#967,618—Aug. 16, 1910 (Reissue)  
Eichorn—#38,202—Aug. 28, 1906 (Design)  
Beecroft—#38,273—Oct. 9, 1906 (Design)  
Beecroft—#38,274—Oct. 9, 1906 (Design)  
Steiner—#38,602—June 4, 1907 (Design)  
Saxton—#72,422—Dec. 17, 1867 (Patent)  
Barnard—#165,912—July 27, 1875 (Patent)  
Fallows—#181,159—Aug. 15, 1876 (Patent)  
Penfield—#362,107—May 3, 1887 (Patent)  
Bayles—#406,332—July 2, 1889 (Patent)  
Clayton—#612,639—Oct. 18, 1898 (Patent)  
Marten—#738,342—Sept. 8, 1903 (Patent)  
Takaba—#693,460—Feb. 18, 1902 (Patent)  
Fairbrother (British)—#17,786—Sept. 25, 1902

Tourtel (British)—#20,567—Aug. 20, 1903

Cockman (British)—#5,186—Dec. 31, 1903

CHAS. E. TOWNSEND,

Attorney for Appellant.

Dated \_\_\_\_\_

JOHN H. MILLER,

Attorney for Appellee.

April 7, 1916.

So ordered:

WM. W. MORROW,

Judge.

[Endorsed]: No. 2759—In Equity. In the United States Circuit Court of Appeals for the Ninth Circuit, Northern District of California. Columbia Graphophone Company (a Corporation), Appellant, vs. Searchlight Horn Company (a Corporation), Appellee. Stipulation as to Printing Patents in the Record. Filed Apr. 8, 1916. F. D. Monckton, Clerk.

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**[Plaintiff's Exhibit No. 2.]**

2—391.

DEPARTMENT OF THE INTERIOR,  
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come,  
Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of an instrument of writing executed by

Peter Christhian Nielsen,

and

Recorded February 17, 1905, in Liber M-71, page 61.

Said record has been carefully compared with the

original and is a correct transcript of the whole thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this 6th day of July, in the year of our Lord one thousand nine hundred and eleven and of the Independence of the United States of America the one hundred and thirty-sixth.

F. A. TENNANT,  
Assistant Commissioner of Patents.

Liber M-71,  
Page 61.

ASSIGNMENT OF LETTERS PATENT.  
TO ALL TO WHOM THESE PRESENTS SHALL  
COME:

WHEREAS letters patent No. 771,441, bearing date the 4th day of October in the year of our Lord one thousand nine hundred and four, were granted and issued by the Government of the United States under the seal thereof to Peter C. Nielsen of Greenpoint, New York, for horns for phonographs or similar machines, a more particular and full description whereof is annexed to the said letters patent in a schedule; by which letters patent the full and exclusive right and liberty of making and using the said invention and of vending the same to others to be used, was granted to the said Peter C. Nielsen, his heirs, executors, administrators or assigns for the term of seventeen years from the same date.

NOW, KNOW ALL MEN BY THESE PRESENTS



That I, the said PETER C. NIELSEN for and in consideration of the sum of Seventeen hundred and sixty-four and 25/100 Dollars (\$1,764.25) to me in hand paid, the receipt whereof is hereby acknowledged, have granted, assigned and set over, and by these presents do grant, assign and set over unto CHRISTIAN KRABBE of the Borough of Brooklyn, County of Kings, City and State of New York, his executors, administrators and assigns forever, the said letters patent, and all my right, title and interest in and to the said invention so granted unto me,

TO HAVE AND TO HOLD the said letters patent and invention with all benefit, profit and advantage thereof unto the said Christian Krabbe, his executors, administrators and assigns, in as full, ample and beneficial manner to all intents and purposes as I, the said Peter C. Nielsen, by virtue of the said letters patent may or might have or hold the same for and during all the rest and residue of the said term of seventeen years.

IN WITNESS WHEREOF I have hereunto affixed my hand and seal this second day of February, 1905.

PETER CHRISTIAN NIELSON. (L. S.)

In the presence of

L. W. WILSON, Jr.

City and State of New York,  
Borough of Brooklyn,  
County of Kings,—ss.

On this Tenth day of February, 1905, before me personally came PETER C. NIELSEN, to me known

and known to me to be the individual described in and who executed the foregoing instrument and he duly acknowledged that he executed the same.

[Seal]

G. J. DEMLIN,  
Notary Public #118,  
Kings County.

Recorded February 17, 1905.

[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cal. Pltffs. Exhibit 2. Oct. 7, '12. W. B. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 2. Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 2. Filed Apr. 8, 1916. F. D. Monckton, Clerk.

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**[Plaintiffs' Exhibit No. 3.]**

2—391.

DEPARTMENT OF THE INTERIOR,  
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come,  
Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of an instrument of writing executed by

Christian Krabbe,  
February 14, 1905,

and Recorded February 17, 1905, in Liber M-71, page  
62.

Said record has been carefully compared with the

original and is a correct transcript of the whole thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this 6th day of July, in the year of our Lord one thousand nine hundred and eleven and of the Independence of the United States of America the one hundred and thirty-sixth.

F. A. TENNANT,

Assistant Commissioner of Patents.

Liber M-71,

Page 62.

WHEREAS I, Christian Krabbe of the Borough of Brooklyn, City of New York, County of Kings and State of New York, am the owner of the whole right, title and interest in and to an invention of an improved horn for phonographs or similar machines, and in and to Letters patent thereon granted to Peter C. Nielsen, bearing date of the 4th day of October in the year of our Lord 1904, and numbered Letters patent #771441 and WHEREAS, William H. Locke, Jr., of the Borough of Brooklyn, City of New York, County of Kings, State of New York, is desirous of acquiring an interest in said invention, and in the said letters patent.

NOW, THEREFORE I, the said Christian Krabbe, in consideration of one dollar to me in hand paid, the receipt of which is hereby acknowledged, hereby sell, assign and transfer unto said William H. Locke, Jr., one half of my undivided right, title and interest in and to said invention, Letters pat-

ent #771441 to the full end of the terms for which said letters patent is granted.

IN TESTIMONY WHEREOF I have hereunto set my hand and seal this 14th day of Feb. 1905.

CHRISTIAN KRABBE.

Witness:

DAVID W. BOYD.

State of New York,  
City and County of New York,  
Borough of Brooklyn,—ss.

On this 14th day of February, 1905, personally appeared before me Christian Krabbe to me known and known to me to be the person described in and who executed the foregoing assignment, and acknowledged to me that he executed the same.

[Seal]

G. J. DEMLIN,

Notary Public, #118, Kings County.

Recorded February 17, 1905.

[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cala. Pltffs. Exhibit 3. Oct. 1, '12. W. B. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 3. Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 3. Filed Apr. 8, 1916. F. D. Monckton, Clerk.

**[Plaintiff's Exhibit No. 4.]**

2—391.

DEPARTMENT OF THE INTERIOR,

United States Patent Office.

To all persons to whom these presents shall come,  
Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of an instrument of writing executed by

William H. Locke, Jr.,

February 24, 1905,

and

Recorded March 1, 1905, in Liber 0-71, page 40.

Said record has been carefully compared with the original and is a correct transcript of the whole thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this 6th day of July, in the year of our Lord one thousand nine hundred and eleven and of the Independence of the United States of America the one hundred and thirty-sixth.

F. A. TENNANT,

Assistant Commissioner of Patents.

Liber 0-71,

Page 40.

Whereas, I, William H. Locke, Jr., of the Borough of Brooklyn, City of New York, County of Kings and State of New York, am the owner of the undi-

vided one-half part of the whole right title and interest in and to an invention of an improvement in Horns for Phonographs or similar machines and in and to letters patent thereon granted to Peter C. Neilsen, October 4th, 1904, and numbered 771,441.

AND WHEREAS, the United States Horn Company of Brooklyn, N. Y., a corporation of New York is desirous of acquiring an interest in said invention and in the said letters patent

Now THEREFORE, I, the said William H. Locke, Jr., in consideration of one dollar to me in hand paid, the receipt of which is hereby acknowledged, hereby sell, assign and transfer unto said United States Horn Company and unto its successors and assigns all my right, title and interest in and to said invention, said letters patent number 771,441, to the full end of the term for which said letters patent is granted.

IN TESTIMONY WHEREOF, I have hereunto set my hand and seal this 24th day of February, Nineteen Hundred and Five.

WILLIAM H. LOCKE, Jr. [Seal]

Witness:

DAVID W. BOYD.

State of New York,  
Borough of Brooklyn,  
County of Kings,—ss.

On this 24th day of February, Nineteen Hundred and Five, personally appeared before me William H. Locke, Jr., to me known and known to me to be the person described in and who executed the fore-



going assignment and acknowledged to me that he executed the same.

DAVID W. BOYD,  
Notary Public Kings Co., N. Y.  
(No. 139)

Recorded March 1st, 1905.

[Endorsed]: No. 15,326. U. S. Dist. Court,  
Nor. Dist. of Cal. Pltffs. Exhibit 4. Oct. 1, '12,  
W. B. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for  
the Ninth Circuit. Plaintiff's Exhibit 4. Received  
Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the  
Ninth Circuit. Plaintiff's Exhibit 4. Filed Apr.  
8, 1916. F. D. Monckton, Clerk.

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**[Plaintiff's Exhibit No. 5.]**

2—391.

DEPARTMENT OF THE INTERIOR,

United States Patent Office.

To all persons to whom these presents shall come,  
Greeting:

THIS IS TO CERTIFY that the annexed is a  
true copy from the records of this office of an instru-  
ment of writing executed by

Christian Krabbe,

February 24, 1905,

and

Recorded March 1, 1905, in Liber 0-71, page 41.

Said record has been carefully compared with the  
original and is a correct transcript of the whole  
thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this 6th day of July, in the year of our Lord one thousand nine hundred and eleven and of the Independence of the United States of America the one hundred and thirty-sixth.

F. A. TENNANT,  
Assistant Commissioner of Patents.

Liber 0-71,

Page 41.

WHEREAS, I, Christian Krabbe, of the Borough of Brooklyn, City of New York, am the owner of the undivided one-half part of the whole right, title and interest in and to an invention of an improvement in Horns for Phonographs or similar machines and in and to letters patent thereon granted to Peter C. Neilsen, October 4th, 1904, and numbered 771,441.

AND WHEREAS, the United States Horn Company of Brooklyn, N. Y., a corporation of New York is desirous of acquiring an interest in said invention and in the said letters patent

NOW. THEREFORE, I, the said Christian Krabbe, in consideration of one dollar to me in hand paid, the receipt of which is hereby acknowledged, hereby sell, assign and transfer unto said United States Horn Company and unto its successors and assigns all my right, title and interest in and to said invention, said letters patent numbered 771,441, to the full end of the term for which said letters patent is granted.



IN TESTIMONY WHEREOF, I have hereunto set my hand and seal this 24th day of February, Nineteen Hundred and Five.

CHRISTIAN KRABBE. [Seal]

Witness:

DAVID W. BOYD.

State of New York,  
Borough of Brooklyn,  
County of Kings,—ss.

On this 24th day of February, Nineteen Hundred and Five, personally appeared before me Christian Krabbe, to me known and known to me to be the person described in and who executed the foregoing assignment and acknowledged to me that he executed the same.

DAVID W. BOYD,  
Notary Public, Kings Co. N. Y.  
(No. 139)

Recorded March 1st, 1905.

[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cala. Pltffs. Exhibit 5. Oct. 1, '12. W. B. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 5. Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 5. Filed Apr. 8, 1916. F. D. Monckton, Clerk.

**[Plaintiff's Exhibit No. 6.]**

2—391.

**DEPARTMENT OF THE INTERIOR,**

United States Patent Office.

To all persons to whom these presents shall come,  
Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of an instrument of writing executed by

United States Horn Company

and

Searchlight Horn Company,

January 4, 1907,

and

Recorded January 8, 1907, in Liber V-75, page 144.

Said record has been carefully compared with the original and is a correct transcript of the whole thereof.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this 6th day of July, in the year of our Lord one thousand nine hundred and eleven and of the Independence of the United States of America the one hundred and thirty-sixth.

F. A. TENNANT,

Assistant Commissioner of Patents.

Liber V 75.

Page 144.

**ASSIGNMENT OF PATENTS.**

WHEREAS one Peter C. Nielsen did obtain

Letters Patent of the United States for an improvement in Horns for Phonographs or similar machines numbered 771,441, and dated October 4, 1904; and whereas Christian Krabbe did by purchase, witnessed by duly executed assignment from said Peter C. Nielsen to said Krabbe under date of February 2, 1905 and recorded in the Patent Office February 17, 1905, acquire the said patent and all rights under the same; and whereas William H. Locke, Jr., did by purchase, witnessed by duly executed assignment from the said Christian Krabbe to the said Locke under date of February 14, 1905 and recorded in the Patent Office February 17, 1905, acquire one undivided half of the entire right, title and interest in and to said Letters Patent; and whereas, the United States Horn Company, a corporation organized under the laws of the State of New York, did by purchase, witnessed by duly executed assignment from said Locke to said United States Horn Company under date of February 24, 1905, and recorded in the Patent Office March 1, 1905, acquire said undivided half of the entire right, title and interest in said patent; and whereas said United States Horn Company did by purchase, witnessed by duly executed assignment from said Christian Krabbe to the said United States Horn Company under date of February 24, 1905, and recorded in the Patent Office March 1, 1905, acquire the remaining undivided half of the entire right, title and interest in and to said Letters Patent, and is now the sole owner of said Letters Patent and all rights thereunder:

AND WHEREAS, said United States Horn Company, as assignee of Gustave Harman Villy, did obtain reissued Letters Patent of the United States for an improvement in Horns for Phonographs, Ear Trumpets, &c, which reissued Letters Patent are numbered 12,442 and bear date of January 30, 1906, said United States Horn Company having by purchase, acquired from said Villy all right, title and interest in and to said invention, and in and to the original Letters Patent of the United States therefor No. 739,954, dated September 29, 1903, as evidence by assignment from said Villy to said United States Horn Company dated October 4, 1905, and duly recored in the Patent Office.

AND WHEREAS, the Searchlight Horn Company, a corporaton organized under the laws of the State of New York, and having its principal office at 753 Lexington Ave., Borough of Brooklyn, City and State of New York, is desirous of acquiring the entire right, title and interest in and to said several Letters Patent and the inventions covered thereby.

NOW THEREFORE to all whom it may concern, be it known that for and in consideration of five promissory notes of which one is for One Thousand Dollars (\$1,000), one for Eight Hundred Dollars (\$800) one for Six Hundred (\$600), one for Five Hundred Dollars (\$500) and one for Two Hundred and Sixty-Six Dollars (\$266), and bearing even date with this assignment, and drawn in favor of said United States Horn Company by said Searchlight Horn Company, all of said notes being payable on demand with interest at . . .

per cent, the receipt of all of said notes being hereby acknowledged by the United States Horn Company, said United States Horn Company has sold, assigned and transferred, and by these presents does sell, assign and transfer unto the said Searchlight Horn Company the whole right, title and interest in and to the said improvement in Horns for Phonographs, and in and to Letters Patent therefor, No. 771,441 aforesaid, and in and to said improvements in Horns for Phonographs, Ear Trumpets, etc., and in and to said reissued Letters Patent therefor No. 12,442; the said several Letters Patent to be held and enjoyed by the said Searchlight Horn Company for its own use and behoof and for the use and behoof of its legal representatives, successors and assigns to the full end of the terms for which said several Letters Patent are or may be granted as fully and entirely as the same would have been held and enjoyed by the said United States Horn Company, had this assignment and sale not been made.

And the said United States Horn Company has also sold, assigned and set over, and does hereby sell, assign and set over unto said Searchlight Horn Company, its successors, assigns and legal representatives, all claims and demands, both in law and in equity, for damages and profits accrued or to accrue on account of the prior, present or future infringement of said several Letters Patent or either thereof, that the United States Horn Company has or may have.

And the said Searchlight Horn Company, for itself, its successors, assigns and legal represen-



tatives, hereby promises, covenants and agrees to bear exclusively the entire expense of instituting and maintaining all suits for past, present and future infringements of said several Letters Patent or either thereof, and to pay over to said United States Horn Company, its successors, assigns and legal representatives, without charge or deduction of any kind, one-half of all the gross damages, judgments, license fees and royalties recovered or secured by the Searchlight Horn Company from past and future infringers or from future licensees immediately upon receipt of such damages, judgments, license fees or royalties.

IN WITNESS WHEREOF, the said United States Horn Company and the Searchlight Horn Company have hereunto caused their respective corporate names to be signed by their respective presidents, and their respective corporate seals to be affixed and attested by their respective secretaries, all being done in the City and State of New York, on this fourth day of January, 1907.

[Seal] UNITED STATES HORN COMPANY,

By ALEXANDER L. WINTER,

Attest.

President,

JOHN C. DEGRAW,

Secretary.

[Seal] SEARCHLIGHT HORN COMPANY.

By WILLIAM H. HOCKE, Jr.

President.

Attest.

CHARLES PERCY BOGART,

Secretary.

Recorded January 8, 1907.

[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cal. Pltffs. Exhibit 6. Oct. 1, '12, W. B. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 6. Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 6. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



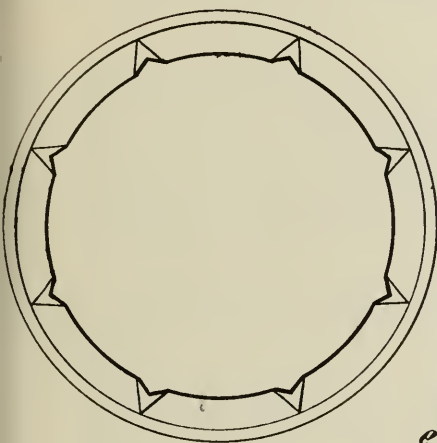
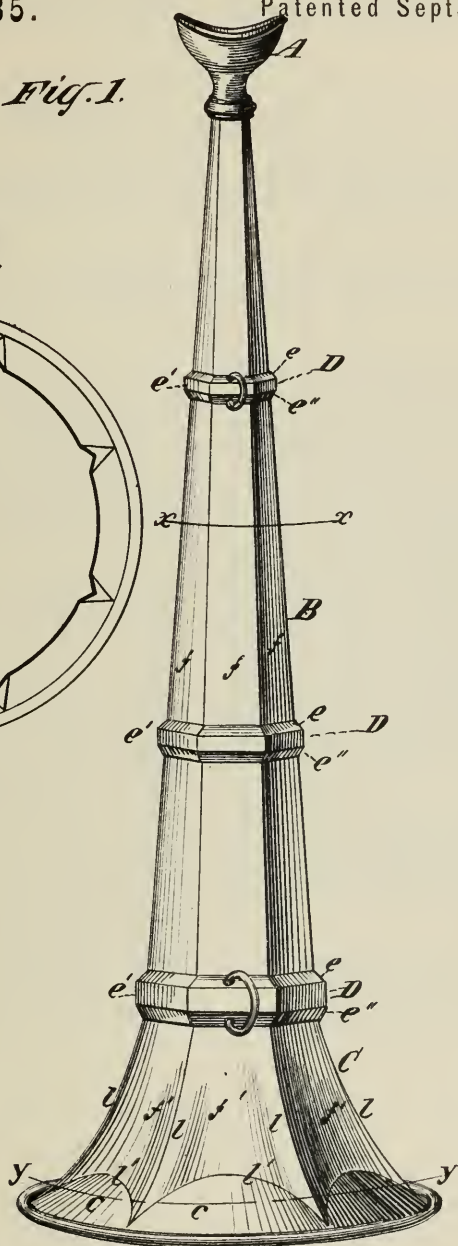


DESIGN.

-----  
**E. CAIRNS.**  
**SPEAKING-TRUMPETS.**

No. 10,235.

Patented Sept. 11, 1877.

*Fig. 1.**Fig. 2.**Fig. 3.*

*Witnesses*  
*John Becker*  
*Fred. Haynes*

*Edward Cairns*  
*by his Attorneys*  
*Brown & Allen*



# UNITED STATES PATENT OFFICE.

EDWARD CAIRNS, OF MORRISTOWN, NEW JERSEY.

## DESIGN FOR SPEAKING-TRUMPETS.

Specification forming part of Design No. **10,235**, dated September 11, 1877; application filed August 24, 1877.  
[Term of Patent 7 years.]

*To all whom it may concern:*

Be it known that I, EDWARD CAIRNS, of Morristown, in the county of Morris and the State of New Jersey, have originated and designed a Design for Speaking-Trumpets, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, making part of this specification.

Figure 1 in the drawing represents a perspective view of a speaking-trumpet embodying my design.

A represents the mouth-piece, B the tube, and C the bell, of the trumpet. The tube B has the form of a truncated polygonal pyramid, extending from the bell C to the mouth-piece A, and presents upon its outer surface the equal and geometrically-similar facets *f*, arranged in such manner that a cross-section made in any part of said tube at right angles with its central longitudinal axis will be a regular equilateral polygon, as shown in Fig. 2.

The bell C is, in form, partly pyramidal and partly conical. The flaring polygonal part comprises external curved facets *f'*. Said facets *f'* are extensions of the facets *f*, and their lines of junction *l* extend to and termi-

nate at the bead *b* at the outer margin of said bell. Said facets *f'* are, moreover, slightly concave on their outer surfaces, from which conformation their lines of intersection *l'* with the round flaring part *c c c* of the said bell are marked curves, giving the entire border of the flaring polygonal part where it joins the said round flaring part a scalloped form. A cross-section through the said conical and pyramidal parts of the bell gives the figure shown in Fig. 3. Upon the tube B are formed or attached at intervals polygonal bands D, having three sets of flat facets, *e e' e''*, so arranged that a cross-section of any of said bands made at right angles with any of said facets will give the figure of a trapezoid the not parallel sides of which are equal.

I claim—

The design for a speaking-trumpet consisting of the polygonally-formed tube B, the combined pyramidal and conical bell C, and the faceted bands D, as herein shown and described.

EDWD. CAIRNS.

Witnesses:

FRED. HAYNES,  
BENJAMIN W. HOFFMAN.



[Endorsed]: District Court of the United States, in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co. vs. Sherman, Clay & Co. Defendant's Exhibit Cairns Patent. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit Cairns Patent. Filed Apr. 8, 1916. F. D. Monckton, Clerk.





C. McVEETY & J. F. FORD.

SHIP'S VENTILATOR.

(Application filed July 10, 1901.)

FIG. 1.

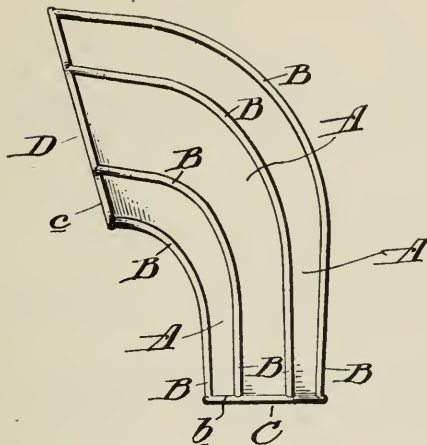


FIG. 2.

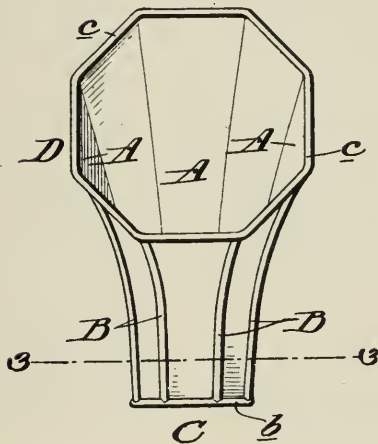
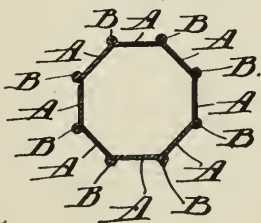


FIG. 3.



WITNESSES:

Booman J. Sterling  
Richard H. Sharp

INVENTORS:

Charles McVeety  
John F. Ford  
By their attorney  
Walter W. Calumore



# UNITED STATES PATENT OFFICE.

CHARLES McVEETY AND JOHN F. FORD, OF PHILADELPHIA, PENNSYLVANIA.

## DESIGN FOR A SHIP'S VENTILATOR.

SPECIFICATION forming part of Design No. 34,907, dated August 6, 1901.

Application filed July 10, 1901. Serial No. 67,794. Term of patent 14 years.

*To all whom it may concern:*

Be it known that we, CHARLES McVEETY and JOHN F. FORD, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented and produced a new and original Design for Ships' Ventilators, of which the following is a specification.

Referring to the accompanying drawings, forming part of this specification, Figure 1 illustrates a side elevation of a ventilator, showing our new design. Fig. 2 represents a front elevation of the same, and Fig. 3 shows a horizontal section taken on line 3 3 of Fig. 2.

As shown in the drawings, the leading or material feature of our design consist of a series of plates A flat in cross-section, as shown in Fig. 3. The plates have arranged at the point of junction ribs B, and at the base C and mouth D are arranged ribs b and c, which intersect the ribs B.

The general contour of the ventilator is that of a curved tapering figure in the form of a cornucopia, being octagonal in cross-section and having convex ribs at the base and mouth, and similar ribs at the intersection of the plates, forming the walls of the ventilator.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

The design for a ventilator substantially as herein shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES McVEETY.  
JOHN F. FORD.

Witnesses:

D. P. S. GARWOOD,  
H. E. COUGHLIN.



[Endorsed]: District Court of the United States, in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co., vs. Sherman, Clay & Co. Defendant's Exhibit McVeety & Ford Design Patent. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendants' Exhibit McVeety & Ford, Design Patent. Filed Apr. 8, 1916. F. D. Monckton, Clerk.





(No Model.)

C. L. HART.  
SHEET METAL PIPE.

No. 409,196.

Patented Aug. 20, 1889.

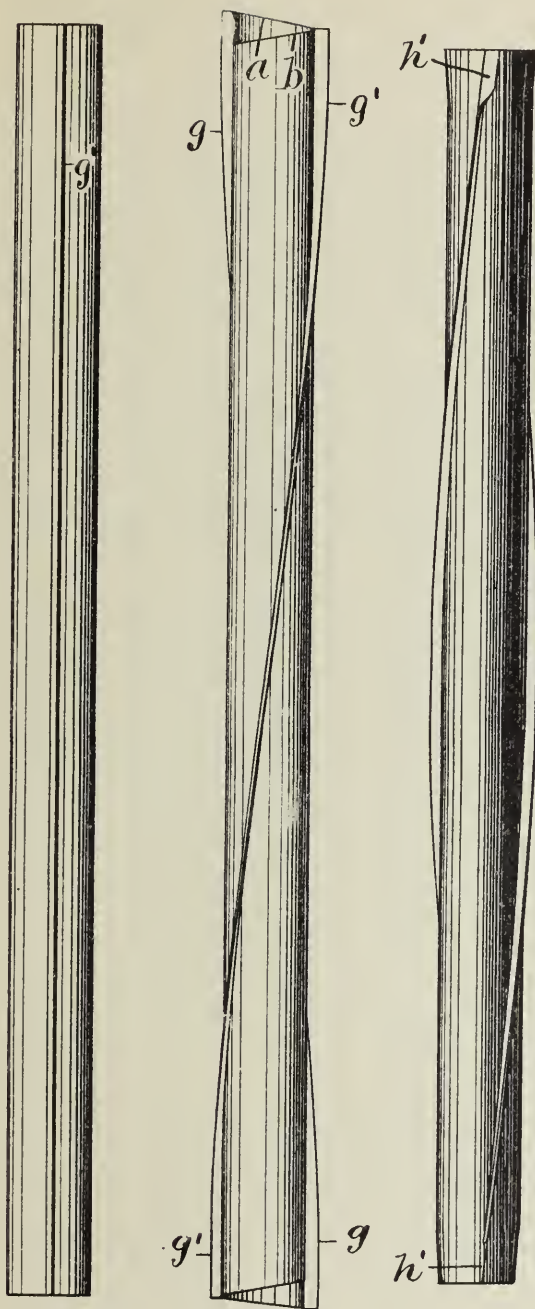


Fig. 1. Fig. 2. Fig. 3

Attest:

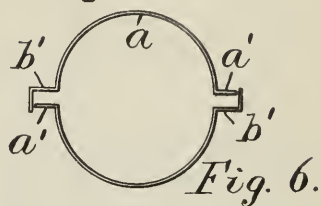
L. Lee.  
F. C. Fischer

Fig. 6.

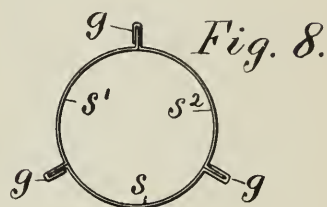


Fig. 8.

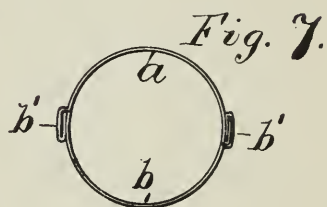


Fig. 7.

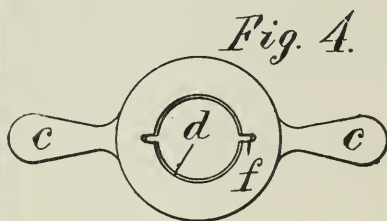
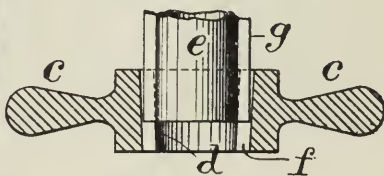


Fig. 4.

Fig. 5.



Inventor.

Charles L. Hart, per  
Crane & Miller, Atty.



CHARLES L. HART, OF BROOKLYN, NEW YORK.

## SHEET-METAL PIPE.

SPECIFICATION forming part of Letters Patent No. 409,196, dated August 20, 1889.

Application filed December 19, 1888. Serial No. 294,134. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES L. HART, a citizen of the United States, residing at Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Sheet-Metal Pipes, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention consists in a sheet-metal pipe formed in two or more longitudinal sections united by longitudinal twisted seams.

It also consists in certain modifications hereinafter fully set forth. When formed with standing spiral seams, the appearance of the pipe is not only novel and ornamental, but the standing spiral seams operate to brace and stiffen the pipe in a very remarkable degree.

In all the pipes heretofore manufactured with spiral seams the pipe has been constructed with a single spiral seam and formed by wrapping a blank transversely to the axis of the pipe and securing one edge of the blank upon the opposite edge of the same blank when lapped spirally thereon. Such a process may be continued indefinitely to form an endless pipe; but to form a pipe in such manner requires special machinery adapted to wind the blank and secure its overlapped edges together, and the object of my present invention is to avoid the expense of such special machinery in forming a pipe with a spiral seam. I effect such object by first forming the pipe of straight longitudinal sections of convenient length united by longitudinal seams and then twisting the whole when seamed together.

The straight longitudinal sections which are required to form a pipe with straight longitudinal seams may be readily shaped without expensive dies in the ordinary cornice-brake found in the shops of all large workers in sheet metal, and they may also be formed in suitable stamping or shaping presses by providing dies of suitable profile and pressing the sheet-metal blanks between them. The pipe may thus be made and seamed longitudinally with very little expense, and may then be twisted bodily to form the twisted seam thereon by merely grasping the two ends of the pipe and turning them in opposite directions.

The invention will be fully understood by reference to the annexed drawings, in which— 55

Figure 1 is a view of a pipe provided with straight longitudinal seams prior to the twisting operation, the view showing the edge of the standing seam *g*. Fig. 2 is a side view of the same pipe with standing seam *g* spirally twisted one-half a revolution in the length of the pipe. Fig. 3 is an edge view of the same pipe with one end of the pipe tapered and a portion of the standing seam removed and the other end flared and the standing seam flattened down. Fig. 4 is an end view of a die adapted to twist such pipe. Fig. 5 is a longitudinal section across the center of the same with one end *e* of the pipe fitted therein. Fig. 6 is an end view of the two sections of a pipe shaped ready for seaming. Fig. 7 is an end view of the same pipe with the seam closed and bent down upon the pipe, and Fig. 8 is an end view of a pipe formed in three longitudinal sections with three standing 75 seams. Figs. 6, 7, and 8 are drawn upon a larger scale than the other figures.

In Fig. 6 the sections of the pipe are shaped each to embrace one-half its circumference, the sections *a* and *b* being provided each with a longitudinal radial flange *a'* at one edge and with a bent flange *b'* at the opposite edge. The sections are thus similar, and any number of similar sections may thus be used in forming the pipe. 85

Fig. 7 shows the sections united together with the flange *b'* closed over the flange *a* and both bent down over the pipe, as in double seaming.

In Fig. 8 the pipe is shown formed in three longitudinal sections *s*, *s'*, and *s''*, united by similar seams, but the seams *g* projecting radially from the pipe. 90

In Figs. 4 and 5 the die is shown provided with handles *c* and formed with a conical bore *d*, adapted to partially admit the end of the pipe *e*. Longitudinal grooves *f* are formed in the sides of the bore to admit the standing seams *g*. The pipe is made in the following manner: 100

Sheet-metal section-blanks of suitable length and width are prepared to form the required sections for one length of pipe, and each is shaped at its edges to form a seam in conjunction with the edges of the adjacent 105 sections. The longitudinal seams are then



closed sufficiently to hold the sections together during the twisting operation, and the seams are, after the pipe is twisted, permanently closed to hold the sections in their twisted position.

It will be readily perceived by comparing Figs. 1 and 2 that the spiral seam in Fig. 2 is necessarily longer upon the same pipe than the straight seam in Fig. 1, and it will therefore be obvious that in the twisting operation one or more of the flanges  $a'$  must slide longitudinally upon certain of the flanges  $b'$  an amount corresponding to the difference in the length of the straight and spiral seams, and that the end of each section will assume an angle with the axis of the pipe, owing to the twisting of each section-blank around such axis. All the seams are not therefore rigidly closed prior to the twisting operation, as such closing would cause a great resistance to such sliding movement of the flanges, but part only of the seams, as the seam  $g'$  in Fig. 2, are closed rigidly before the pipe is twisted position.

It will be noticed in Fig. 2 that the ends of the blanks  $a$  and  $b$  coincide upon the closed seam  $g'$ , thus forcing the sliding of the flanges to occur upon the seam  $g$ , at the ends of which the displacement is obvious. It will also be understood that the metal in the flanges  $a'$  and  $b'$  is materially changed in form during the twisting operation, and receives a permanent set to such form before and during the final closing of the seams. It is well known that longitudinal blanks bent in the form shown in Fig. 6 are in practice, when formed, more or less warped or buckled, so that the flanges  $a'$  and  $b'$  upon the opposite edges of the section  $a$  or  $b$  would not lie in the same flat plane. The seaming of the sections together brings the flanges  $a'$  and  $b'$  into contact without materially affecting the tendency of the sections to warp or buckle, and a perfectly straight pipe is not therefore produced by the mere joining of the seams. I have, however, discovered that the twisting operation serves to remove all the buckle from the pipe and to make it exceedingly straight, while the "set" imparted to the respective sections and the seams formed upon their edges serve to hold the pipe permanently in such straight condition. By retaining the seams in a radial position upon the finished pipe at the close of the final seaming operation, as shown in Figs. 2, 3, and 8, the standing seam greatly re-enforces the pipe in every direction and imparts to it an unusual degree of strength and rigidity.

It will be understood by reference to Fig. 1 that the edges of the sections  $a$  and  $b$  in the untwisted pipe are parallel with the axis of the cylinder or pipe which they form, the curvature of the metal being transverse at the edges to such axis, while an inspection of Fig. 3 will show that the twisting operation entirely changes the cylindrical curva-

ture of the metal, so that the line of the curvature is not parallel with the edges of the sections, but at an angle thereto equal to the arc through which the pipe is twisted.

The spiral seam formed upon the pipe in my invention is a much longer and more gradual spiral than could be formed by spirally winding a single blank and securing its overlapped edges, and my construction is readily distinguished from any pipe having a single spiral seam instead of two or more, as in my invention.

The blanks for the sections may be formed with oblique ends, so that when the pipe is twisted its ends will be at right angles to its axis. When the standing seam is used, the pipe-lengths may be readily fitted together by flattening down or removing a portion of the seam at each end and fitting the ends to enter one into the other, as is common with sheet-metal pipes, and shown upon the pipe in Fig. 3 at  $h$  and  $h'$ .

It is immaterial how the pipes are twisted after seaming or how the seams are finally locked to hold the sections in their twisted position, and no means for locking the seams is therefore shown herein.

Having thus set forth my invention, what I claim is—

1. As a new article of manufacture, a sheet-metal pipe formed in two or more longitudinal sections and having twisted seams at the joints of the sections, substantially as herein set forth.

2. As a new article of manufacture, sheet-metal pipes in uniform lengths formed in two or more longitudinal sections and having twisted seams at the joints of the sections, substantially as herein set forth.

3. As a new article of manufacture, a sheet-metal pipe formed in two or more longitudinal sections and having twisted standing seams at the joints of the sections, substantially as herein set forth.

4. As a new article of manufacture, a sheet-metal pipe formed in two or more longitudinal sections and having twisted standing seams at the joints of the sections, with the projection of the seam removed at the ends of the pipe and the ends longitudinally flared and tapered to join the same in series, substantially as herein set forth.

5. As a new article of manufacture, a sheet-metal pipe formed in two or more longitudinal sections united by longitudinal standing seams and having the sections and seams twisted and held in a twisted condition by the locking of the seams, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses

CHARLES L. HART.

Witnesses:

ANSON O. KITREDGE,  
HENRY COLWELL.

[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cal. Dfts. Exhibit G. Oct. 2, '12. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit G. Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit G. Filed Apr. 8, 1916. F. D. Monckton, Clerk.





(No Model.)

A. GERSDORFF.  
FUNNEL.

No. 453,798.

Patented June 9, 1891.

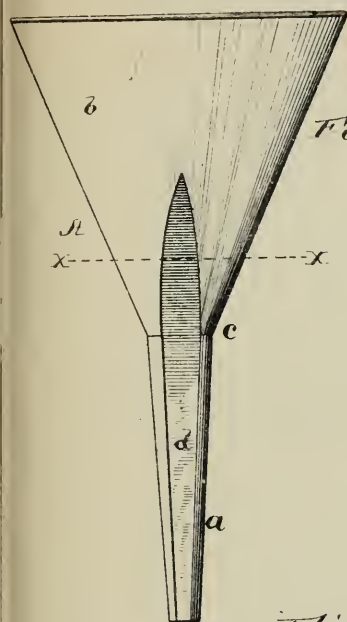


Fig. I.

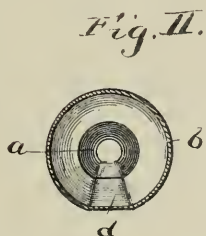


Fig. II.

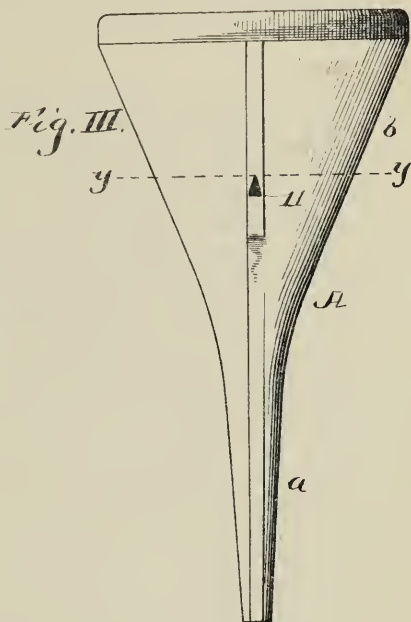


Fig. III.

Fig. IV.

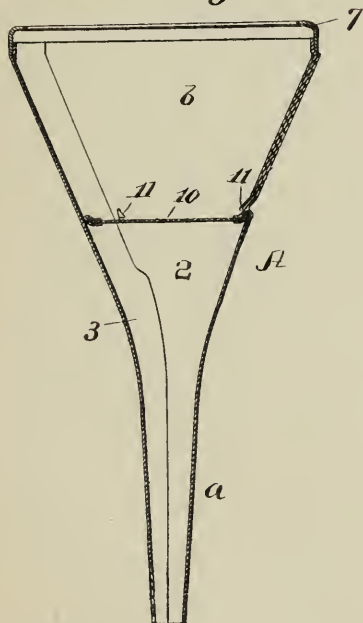
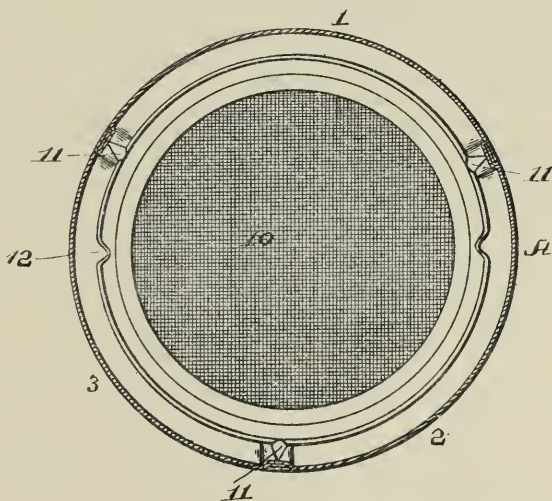


Fig. V.



Witnesses:

J. B. McGinnis.  
Wm. O. Belt.

Inventor:

Augustus Gersdorff.  
By Edwin B. Bost,  
his attorney.



AUGUSTUS GERSDORFF, OF BRIDGETON, NEW JERSEY.

## FUNNEL.

SPECIFICATION forming part of Letters Patent No. 453,798, dated June 9, 1891.

Application filed June 23, 1890. Serial No. 356,435. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUSTUS GERSDORFF, a citizen of the United States, residing at Bridgeton, in the county of Cumberland and State of New Jersey, have invented certain new and useful Improvements in Funnels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved funnel of that class in which vents are provided in the nozzle for the escape of air while liquids are being poured through the funnel into a vessel.

My invention consists in the combination of a funnel having seats or lugs arranged interiorly within the body thereof and a removable strainer seated within said funnel and having a spring-flange bearing upon the interior seats or lugs, which operate to hold the strainer against displacement, all as will be hereinafter more fully described and claimed.

To enable others to more readily understand my invention, I will now proceed to a detailed description of the same in connection with the accompanying drawings, in which—

Figure I is an elevation of the funnel embodying my invention. Fig. II is a transverse sectional view through the body of the funnel above the joint between the nozzle and body on the plane indicated by the dotted line *xx* of Fig. I. Fig. III is an elevation of my preferred form of funnel having the body and nozzle made of longitudinal sections. Fig. IV is a vertical sectional view through the funnel shown in Fig. III, and Fig. V is a transverse section on the line *yy* of Fig. III.

Like letters and numerals of reference denote corresponding parts in all the figures of the drawings.

A designates my improved funnel, which comprises the tapered body *b* and the nozzle *a*. The body and nozzle may be made of separate pieces and connected together by the joint *c* in the ordinary manner; but as a better and cheaper manner of making the funnel I prefer to construct it in longitudinal sections 1 2 3, which may consist of two, three, or more, each section forming a part of the body and nozzle of the funnel.

The device constructed as shown in Figs. I and II has its round nozzle flattened on one side to form a vent *d*, which vent extends longitudinally of the nozzle and into the body *b* to a point about or above midway of the length of said body, which is advantageous, as it provides for the escape of air should the funnel be placed in a vessel having a mouth of greater diameter than the cross-sectional area of the nozzle.

The preferred form of the funnel shown in Figs. III and IV has its nozzle provided with a plurality of flat sides and forming a series of vents, and the nozzle in the cross-section preferably has the form of a triangle, as shown and described in a prior patent issued to me February 8, 1887, and numbered 357,476.

The sections 1 2 3 of the funnel extend from the top of the body to the lower end of the nozzle, each section forming a part of the body and nozzle. The parts of the section which form the body of the nozzle are each made segmental in cross-section, and the lower parts of said section that form part of the nozzle are flattened. The sections are united together along their side edges through the body of the funnel by bending the same to form flanges and interlocking and soldering the flanges together, thus forming longitudinal seams; but in the nozzle the sections are united by soldering, instead of interlocking the flanges, thus forming continuous smooth seams. The segmental portions of the sections form the body, which is circular in cross-section, and the flattened lower portions of said sections form the triangular nozzle, as shown. The upper end of the funnel is finished and the ends of the joints between the side sections 1 2 3 concealed by an annulus or ring 7, which is bent or curved to extend inward a short distance.

In connection with my improved funnel I employ a strainer 10, which is adapted to be fitted within the body of the funnel and to be held therein by means of lugs 11, formed interiorly within the funnel. In order to provide lugs which shall be sufficiently strong and not easily broken and without weakening the funnel, I stamp or press the lugs through the locked seams which unite the sections of the funnel, and these lugs are preferably tapered and have their lower ends made broad to pro-

vide a bearing-surface against which the screen impinges or bears. To permit the screen to be readily adjusted or fitted within the funnel below the lugs and to remove the screen when desired, I form recesses 12 (one, two, or more) in the edge of the screen by indenting or forcing the edge inwardly. The screen can be readily sprung or forced into position within the body of the funnel and below the lugs therein, which lugs operate to firmly secure the same in place; but to remove the screen from the funnel it must be turned so that one of the lugs enters one of the recesses, after which the screen will readily drop out of the funnel when it is inverted, or it can be removed by hand.

A funnel constructed as contemplated by my present invention can be readily and easily cleaned, as the absence of the joint between the body and nozzle of the funnel provides a smooth surface, which facilitates the cleaning of the funnel.

Changes in the form and proportion of parts can be made without departing from the spirit or sacrificing the advantages of my invention, and I would therefore have it understood that I reserve the right to make such modifications as fall within the scope of my invention.

No claim is herein made to the funnel made of longitudinal sections, each section forming a part of the body and nozzle of the funnel and extending from the point of the nozzle to the top of the body, the sections being joined together by longitudinal seams, nor to the nozzle formed with the flattened side or sides, as these features form the subject-matter of a separate application filed by me on the 19th day of March, 1888, Serial No. 267,645.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the funnel having within the interior of its body the inwardly-projecting lugs, a strainer having a spring-flange, which is adapted to pass downward over and be locked in place by said lugs, substantially as described.

2. In combination with the funnel provided with the inwardly-projecting locking-lugs, and the strainer having a spring-flange, which is thus adapted to pass downward over and to be locked in place by said lugs, and is provided within its edge with notches that when caused to coincide with said lugs will operate to release said strainer and permit of its removal, substantially as herein shown and described.

3. The combination of a funnel provided with the retaining-lugs, which are arranged interiorly within the body of the same, and which lugs are stamped or pressed from the seams which unite the sections of the funnel together, and a strainer provided with a spring-flange, which is adapted to pass downward over and be locked in place by the said lugs, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUSTUS GERSDORFF.

Witnesses:

JAMES J. REEVES,  
HUGH L. REEVES.

[Endorsed]: District Court of the United States in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co. vs. Sherman, Clay & Co. Defendant's Exhibit Gersdorf Patent. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit, Gersdorf Patent. Filed Apr. 8, 1916. F. D. Monckton, Clerk.







A. GERSDORFF.  
FUNNEL.

No. 491,421.

Patented Feb. 7, 1893.

Fig. 1.

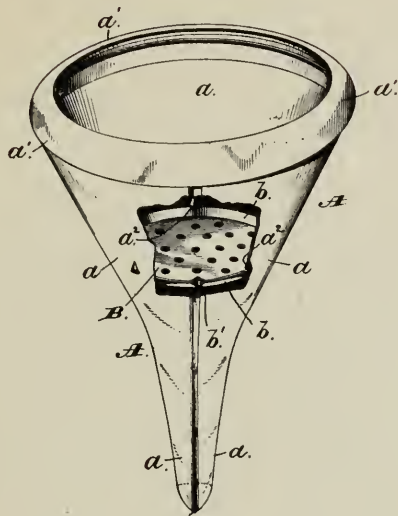


Fig. 2.

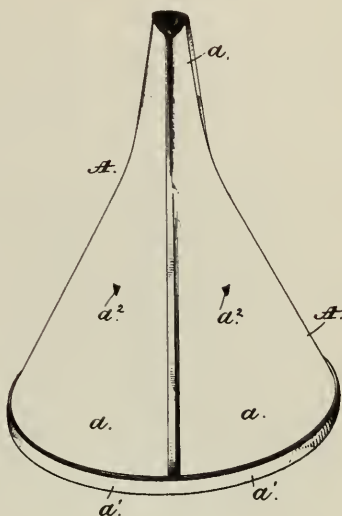


Fig. 4.

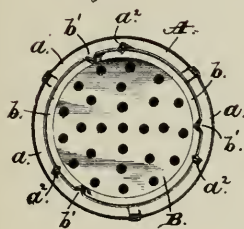


Fig. 3.

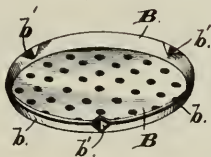


Fig. 5.

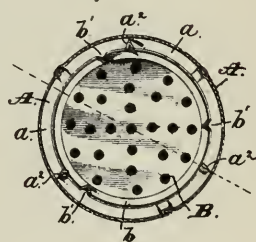
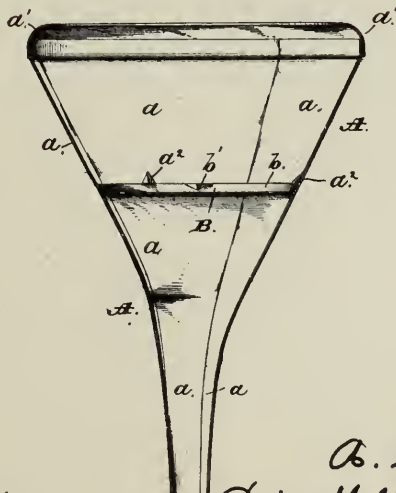


Fig. 6.



Witnesses:  
Jas. E. Hutchinson.  
Henry C. Hazard.

Inventor.  
A. Gersdorff, by  
Erindler & Russell, his Attys.



# UNITED STATES PATENT OFFICE.

99

AUGUSTUS GERSDORFF, OF WASHINGTON, DISTRICT OF COLUMBIA.

## FUNNEL.

**SPECIFICATION** forming part of Letters Patent No. 491,421, dated February 7, 1893.

Application filed March 19, 1888. Serial No. 267,645. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUSTUS GERSDORFF, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Funnels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved funnel, from the upper end, a portion of the side being broken away to show the strainer; Fig. 2 is a like view of the same from the lower end. Fig. 3 is a perspective view of the strainer separated from the funnel. Fig. 4 is a horizontal section of the funnel at the point where the strainer is located and shows the latter in position for engagement with the locking lugs; Fig. 5 is a like view of the same after said strainer is so engaged, and, Fig. 6 is a central longitudinal section of the funnel.

Letters of like name and kind refer to like parts in each of the figures.

My invention is an improvement upon a funnel for which Letters Patent No. 357,476 were issued to me upon the 8th day of February, 1887, and it consists, principally, in the construction of the funnel, substantially as and for the purpose hereinafter specified.

In the construction of funnels it has heretofore been customary to form the body and nozzle separately and then join them together, but such construction has proved defective in consequence of the frequent separation of said parts.

My funnel A is formed from two or more—preferably three—sections *a* and *a'* which are united upon longitudinal lines so that each section extends from the upper end to the lower end of the funnel and constitutes a part of the body and a part of the nozzle of the same, as shown. The joints or seams are all lengthwise of the funnel, and in the direction of the greatest strain—transversely—said funnel presents only solid metal which is strengthened by its curved form and by said seams, and is capable of resisting successfully a much greater force than would ever be exerted by any proper use.

In the practical use of funnels, it frequently happens that the funnel is placed in a vessel having a mouth of larger diameter than the

cross sectional area of the nozzle of the funnel, so that the nozzle depends wholly within the mouth of the vessel and the lower portion of the body of the funnel rests upon the vessel, in which event the funnel prevents the free escape of air displaced in the vessel by pouring a liquid therein.

One of the aims of my present invention is to improve the funnel to avoid the foregoing objection, which is accomplished by providing the nozzle with one or more flattened longitudinal faces to form the vent or vents, and extending the vent or vents into the body of the funnel for a suitable distance and above the joint or line between the body and nozzle of the funnel, whereby air can freely escape through the vent on the outside of the funnel if it is placed on a vessel so that its body is in contact with the mouth of said vessel.

As hereinbefore stated, the funnel is made wholly of longitudinal sections which extend from the top of the body of the funnel to the lower end of the nozzle. The parts of the sections which form the body of the funnel are each made segmental in cross section, and the lower parts of said sections which form the nozzle are flattened. The sections are united together along their side edges through the body of the funnel by bending the same to form flanges and by interlocking and soldering the flanges together, thus forming the longitudinal seams; but in the nozzle, the sections are united by soldering instead of interlocking the flanges, thus forming smooth seams in the nozzle. The segmental portions at the upper ends of the sections form the body of the funnel which body is circular in cross section; and the flattened lower portions of said sections form the nozzle which is triangular in cross section, as shown in the drawings.

A funnel constructed as contemplated by my invention can be readily and easily cleaned, as the absence of the joint between the body and nozzle of the funnel provides a smooth surface on the interior of the funnel, which facilitates the cleaning of the funnel.

The upper end of the funnel has an upward and inward curve and is formed by means of a solid ring *a'* of sheet metal which is given the necessary shape by dies and has such size as to enable its lower edge to pass over and

engage with the upper edges of the sections  $a$  and  $a$ , where it is secured in place by solder and operates to thoroughly strengthen said parts and prevent their separation at such point.

Within the body of the funnel is a strainer B which is constructed from sheet metal and its central portion perforated, and around its edge is provided with a flange  $b$  that extends upward and outward at substantially the same angle as the adjacent sides of the funnel. Said strainer bears fairly upon the converging sides of said funnel and is thereby prevented from passing below a certain point and is locked in such position by means of two or more lugs  $a^1$  and  $a^2$  which project inward from the sides of the funnel and engage with the upper edge of the flange  $b$ . The lugs  $a^2$  and  $a^1$  have downwardly and inwardly inclining faces and the strainer B is placed in position by inserting one edge beneath the lug or lugs at one side of the funnel and then pressing the opposite side of said strainer downward until its flange has sprung inward sufficiently to enable it to pass the lug or lugs at such point.

In order that the strainer may be removed from the funnel, when desired, its flange  $b$  is provided with notches  $b'$  and  $b'$  which correspond in size and number to the like features of the lugs  $a^2$  and  $a^1$ , and have such relative arrangement that by a partial rotation of said strainer, said notches may be caused to coincide with said lugs and thus release said strainer. The same result will be secured however, if but one notch is provided, as by causing such notch to coincide with one of the lugs; the side of the strainer in which said notch is located will be released and can be raised so as to withdraw the opposite side from engagement with its locking lugs.

No claim is herein made to the combination of the funnel having the lugs arranged interiorly within the body thereof, and the strainer provided with the spring flange which is thus adapted to pass downward beneath the lugs and to be held or locked in place by the same, as said devices form the subject matter of a separate application filed by me on the 23d day of June, 1890, Serial No. 356,435.

Having thus described my invention what I claim is—

1. As a new article of manufacture, a funnel made of longitudinal sections united together by longitudinal seams and each section forming a part of the body and nozzle of the funnel, the nozzle having flattened sides which form air vents that extend longitudinally of the nozzle, into the body, and above the line where said nozzle joins the body, substantially as described.

2. As a new article of manufacture, a funnel made of longitudinal sections united together by longitudinal seams and each section forming a part of the body and nozzle of the funnel, the nozzle having flattened sides which form air vents that extend longitudinally of the nozzle, into the body, above the line where the nozzle joins the body, the seams of the body being formed by interlocking and soldering flanges and the seams in the nozzle being soldered together, whereby the inner surface of the body and nozzle is made smooth, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 17th day of March, 1888.

AUGUSTUS GERSDORFF.

Witnesses:

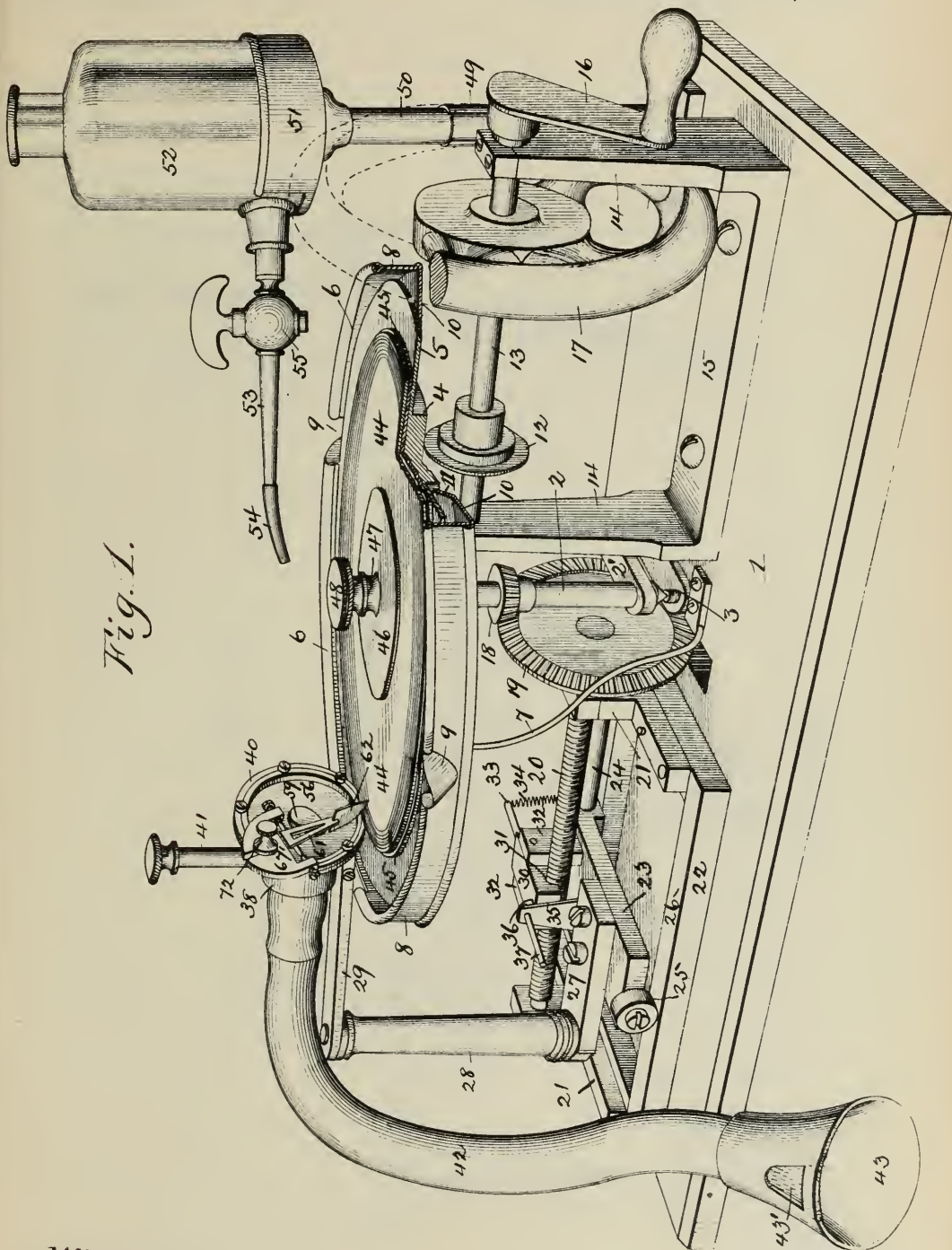
JAS. E. HUTCHINSON,  
GEO. S. PRINDLE.



E. BERLINER.  
GRAMOPHONE.

No. 534,543.

Patented Feb. 19, 1895.



Witnesses;  
 Percy C. Bowen.  
 F. J. Chapman.

Inventor:  
H'mile Berliner,  
By Joseph Lyon.



(No Model.)

4 Sheets—Sheet 2.

E. BERLINER.  
GRAMOPHONE.

No. 534,543.

Patented Feb. 19, 1895.

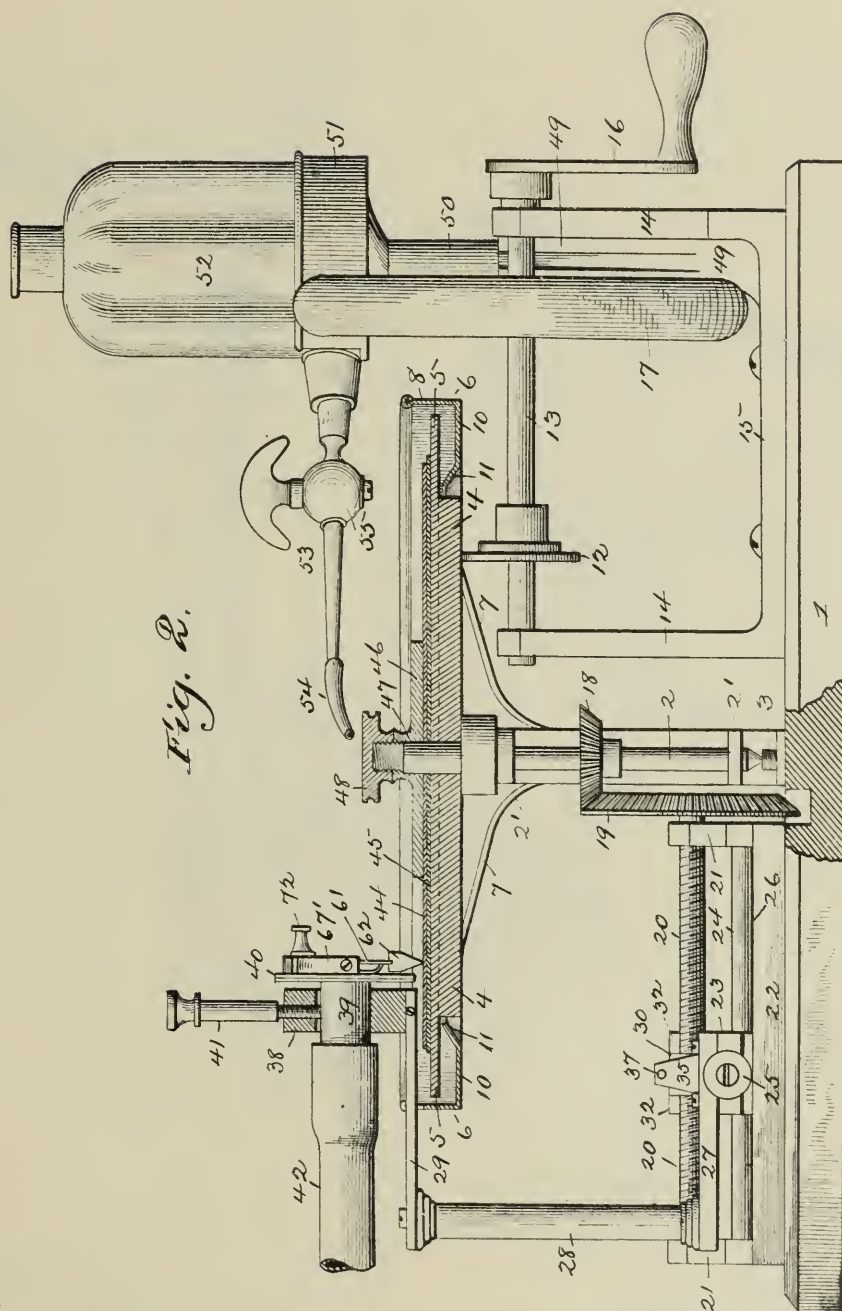


Fig. 2.

Witnesses:

J. B. McGiv.  
F. T. ChapmanInventor,  
Emile Berliner,  
By Joseph Lyons.





(No Model.)

4 Sheets—Sheet 3.

E. BERLINER.  
GRAMOPHONE.

No. 534,543.

Patented Feb. 19, 1895.

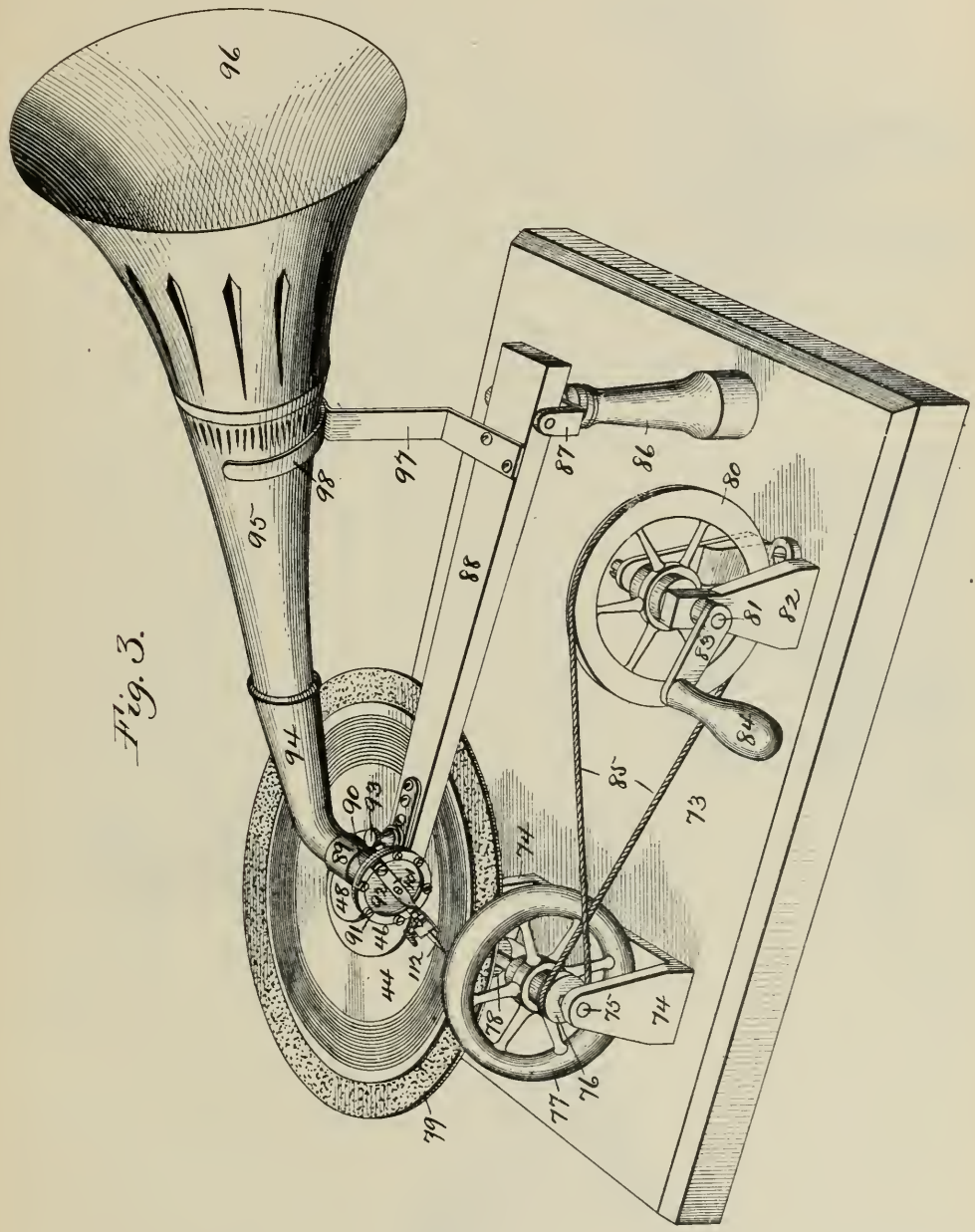


Fig. 3.

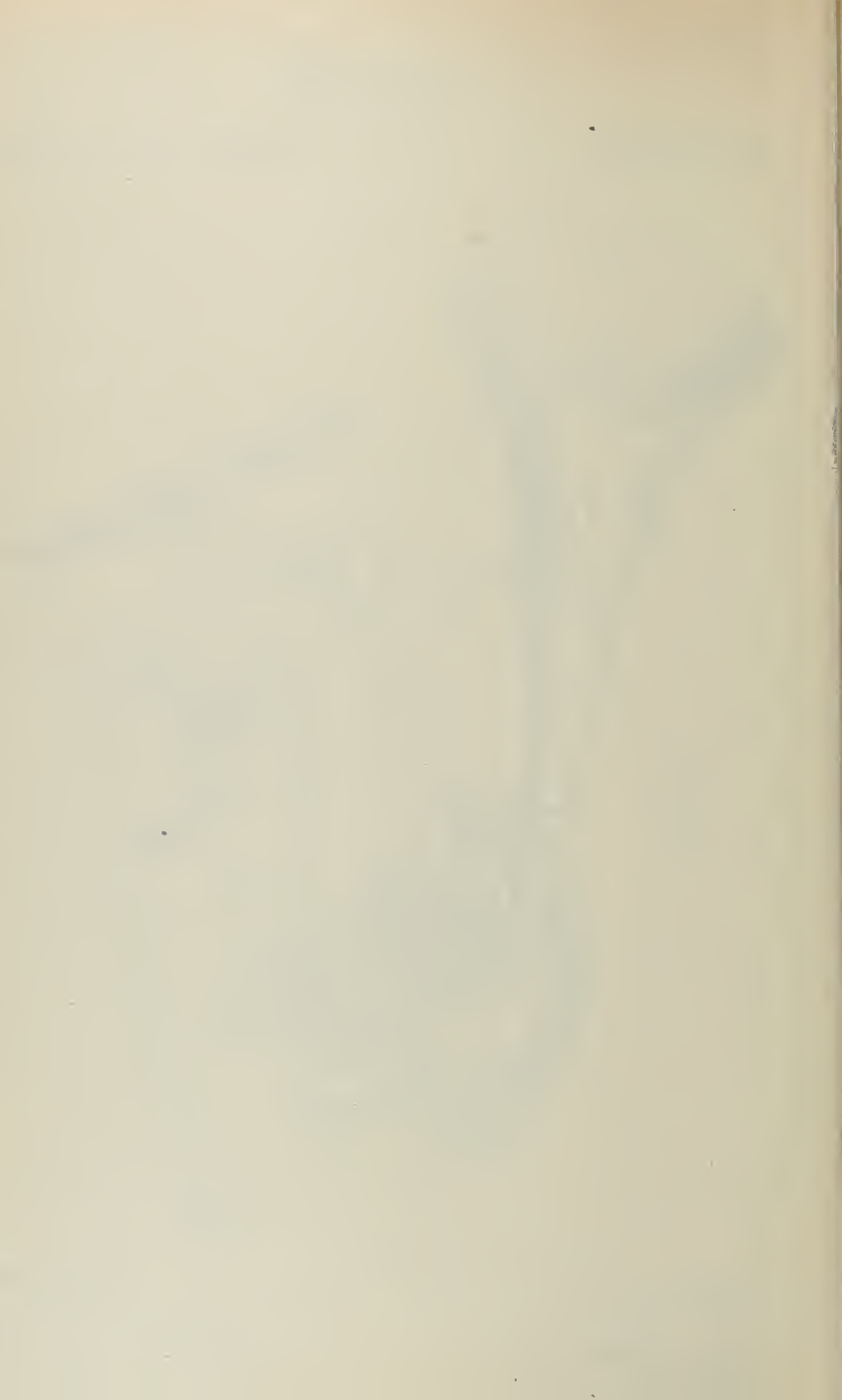
Witnesses;

*Percy C. Bowen.*  
*H. T. Chapman.*

Inventor;

*Emile Berliner,*

By *Joseph Lyons.*  
Attorney.



# E. BERLINER. GRAMOPHONE.

No. 534,543.

Patented Feb. 19, 1895.

Fig. 4.

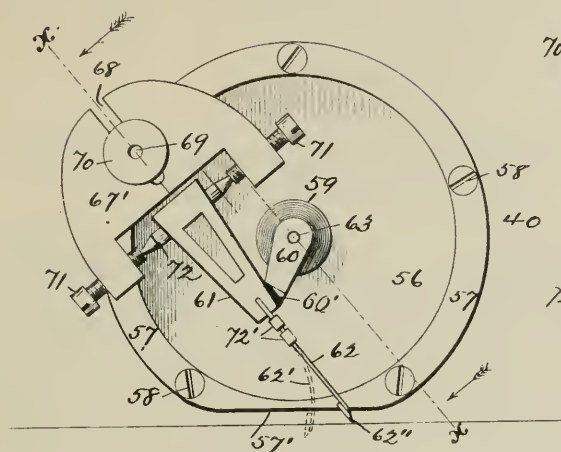


Fig. 5.

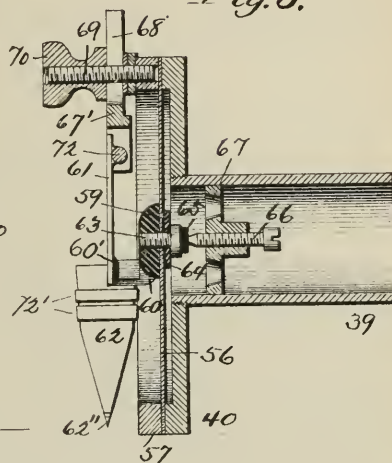


Fig. 6.

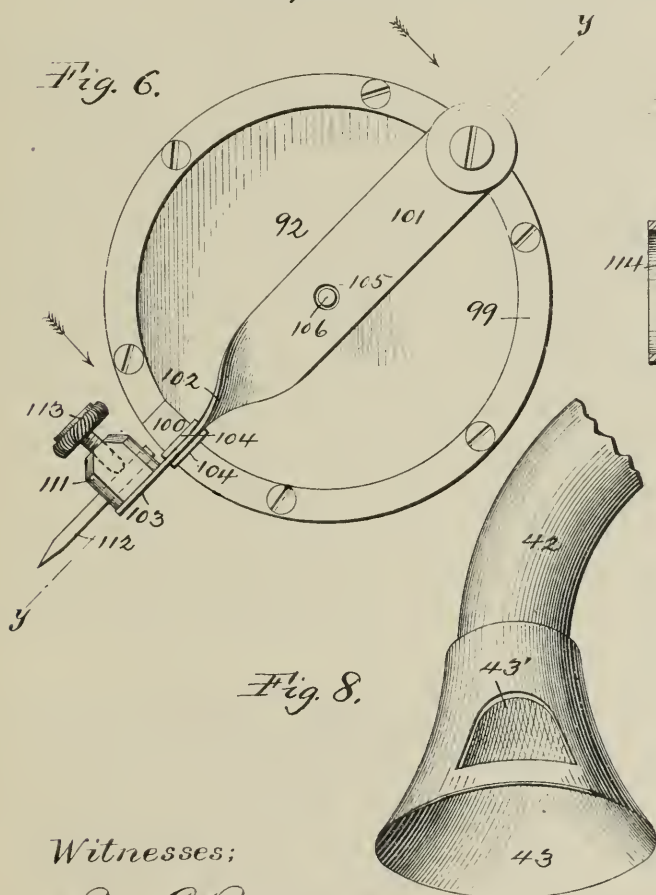


Fig. 7.

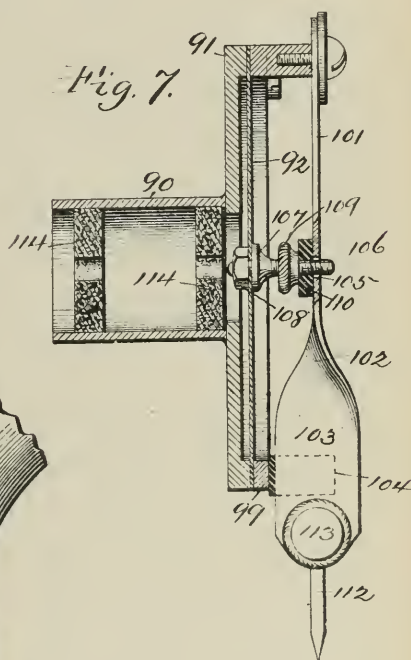
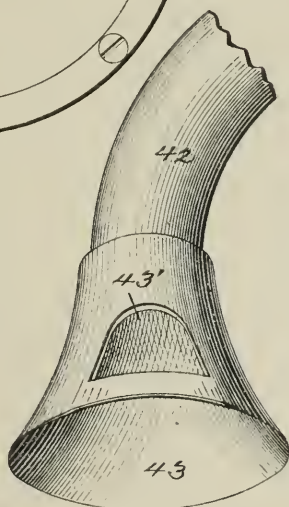


Fig. 8.



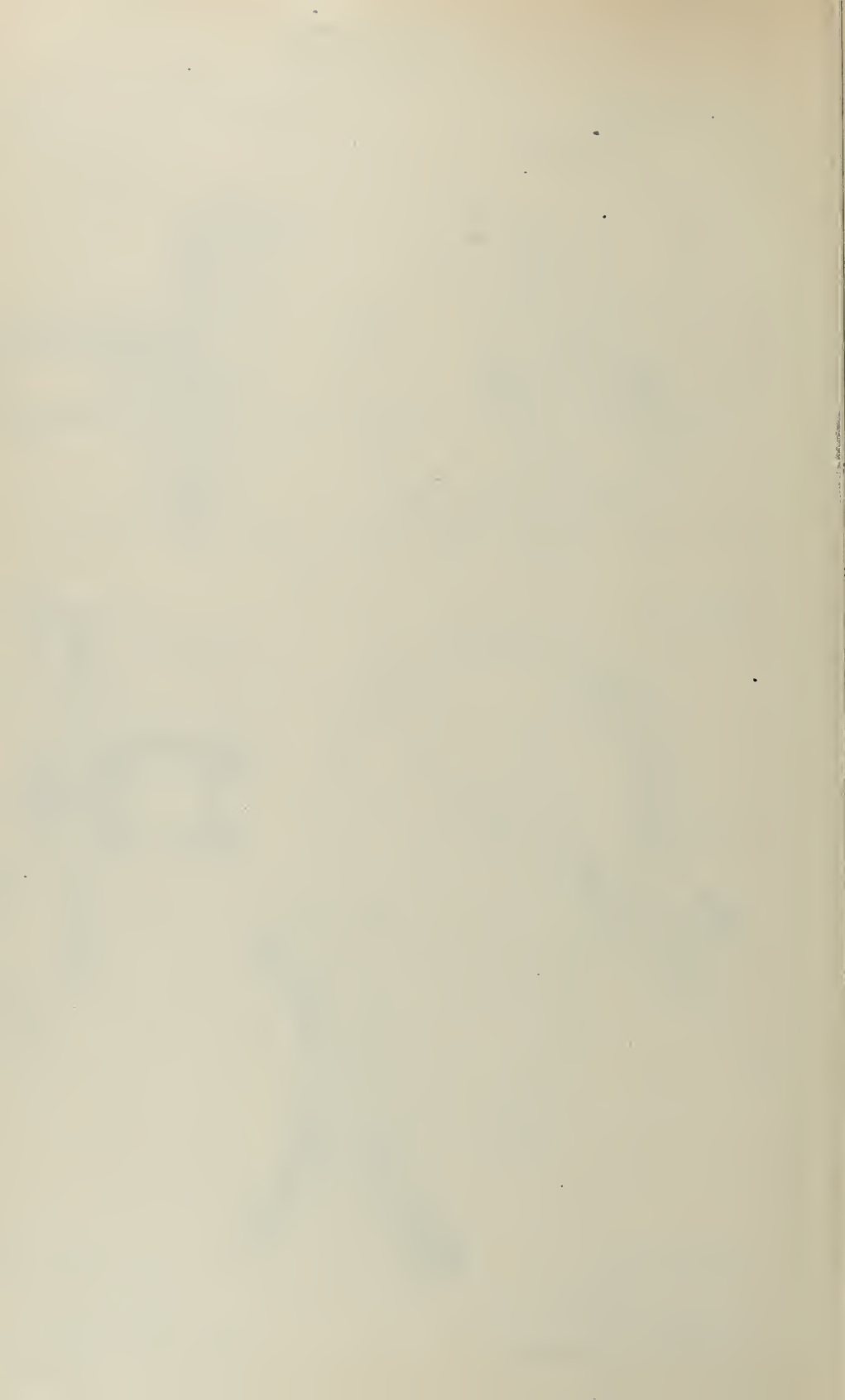
Witnesses;

*Percy C. Bowen.*  
*J. T. Chapman*

Inventor;

*Emile Berliner,*

*By Joseph L. G. ...*  
Attorney.





# UNITED STATES PATENT OFFICE.

EMILE BERLINER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR  
TO THE UNITED STATES GRAMOPHONE COMPANY, OF SAME PLACE.

## GRAMOPHONE.

SPECIFICATION forming part of Letters Patent No. 534,543, dated February 19, 1895.

Application filed March 30, 1892. Serial No. 427,080. (No model.)

### *To all whom it may concern:*

Be it known that I, EMILE BERLINER, a citizen of the United States, and a resident of Washington, District of Columbia, have invented certain new and useful Improvements in Gramophones, of which the following is a specification.

My invention has reference to improvements in the method of and apparatus for recording and reproducing sounds, the improvements being more particularly directed to the construction of that kind of sound recording and reproducing apparatus which I have called "gramophone," and for which Letters Patent of the United States No. 382,790, dated May 15, 1888, have been granted to me.

One feature of my invention has reference to improvements in the method of recording sound by tracing upon a fatty film deposited upon a metallic surface, undulatory lines, corresponding to sound waves, and then etching such lines in the metal base, or as it is now commonly called, the record tablet; while the other features of my invention have reference to the construction of the details of both the recorder and the reproducer of the gramophone. Each of these features of improvement are designed to overcome certain difficulties, and to avoid certain imperfections heretofore met with in the operation of the gramophone. These difficulties and imperfections, and the manner in which they are avoided, will be particularly pointed out in the following detailed description with reference to the accompanying drawings, in which—

Figure 1, is a perspective view of my improved gramophone recorder. Fig. 2 is a side elevation, partly in section, of the recorder. Fig. 3 is a perspective view of a gramophone reproducer. Fig. 4, is an elevation of a recording diaphragm and stylus. Fig. 5, is a section of the same on the line  $x-x$  of Fig. 4. Fig. 6, is an elevation of the gramophone reproducing diaphragm and stylus. Fig. 7, is a section of the same on line  $y-y$  of Fig. 6, and Fig. 8, is a perspective view of an improved mouth-piece for the recorder.

Like numerals of reference indicate like parts throughout the drawings.

My improved gramophone recorder is shown

as a whole in Figs. 1 and 2, mounted upon a suitable base 1. About midway of the length of this base there is an upright shaft 2, journaled in brackets 2', stepped at its lower end in a suitable bearing 3. This shaft carries at its upper end a circular disk 4, the outer or peripheral portion of which is reduced in thickness as shown at 5, and this reduced portion extends over a ring shaped pan 6, supported by stays or brackets 7, from which it may be lifted and removed, when required. The outer edge or wall 8, of the pan is of sufficient height to project for a distance above the disk 4, and is provided with pouring lips 9, for a purpose hereinafter described. The bottom 10 of the pan extends under the reduced portion 5, of the disk 4, and its inner edge 11, is upturned close to the under side of the reduced portion of the disk, as shown.

Bearing against the under side of the disk 4, is a friction wheel 12, secured to a horizontal shaft 13, which latter is journaled in the upper ends of posts or uprights 14 constituting the ends of a frame, the base 15, of which is secured to the base 1 of the apparatus. The position of shaft 13, and the diameter of the friction wheel 12, are such, that a portion of the weight of the disk 4, and of its shaft 2, is supported by the friction wheel; whereby the bearing 3, is relieved from a portion of that weight, and whereby frictional gearing between the disk 4 and wheel 12 is insured, without requiring special adjustment. The shaft 13, carries at its outer end a crank 16, by means of which it is rotated, and between the two uprights 14, there is secured to the shaft a heavy fly or balance wheel 17. Secured to the upright shaft 2, below the disk 4, there is a beveled pinion 18, meshing with a large bevel gear 19, on one end of a horizontal screw-threaded shaft 20, which is arranged radial to the disk 4, and journaled adjacent to the said gear 19, and also at the other end, in pillow-blocks 21, supported on the end piece of a rectangular frame 22, which in turn is fast on the base 1. Mounted upon the frame 22, so as to be movable thereon in the direction of the length of the shaft 20, there is a carriage 23, supported at one end by a guide rod 24, on which it is free to slide, and at the other end by a roller 25, movable

along the upper surface 26, of one of the side pieces of the frame 22. The carriage 23, has firmly secured to it a projecting arm 27, on the outer end of which is an upright post 28, carrying at its upper end an arm 29, parallel with the arm 27, and of such length as to overhang the disk 4, when the carriage is moved to the right, as represented in the drawings; the construction being such, that when the carriage 23 is moved in the manner to be described, the arm 29, will be carried radially over the disk 4, and any object carried thereby will participate in said movement.

The carriage 23, is moved in one direction by means of the screw-threaded shaft 20, and in order to effect this operation, there is provided a block 30, in one side of which, near one end, is formed a half nut 31, constructed to engage the threads on the shaft 20; and this block 30, is pivotally supported between ears 32, erected on the carriage 23. Projecting from the other end of the block 30, there is a pin 33, to which one end of a spring 34, is attached, the other end of said spring being secured to the carriage 23, and the tendency of the spring is to maintain the block 30, in a tilted position with the nut portion raised out of engagement with the shaft 20. In order to lock the block 30, in engagement with the shaft 20 there is provided a leaf spring 35, mounted on the carriage 20, opposite the free end of the block 30, and having on its free end a tooth 36, which passes over the top of the hinged block 30, when the nut formed in the same is in engagement with the screw threads on the shaft 20, the tendency of the leaf spring 35, being to move inwardly toward the block 30. This catch spring 35, is also provided with a pin 37, which serves as a handle for withdrawing the catch so as to unlock the block 30, and thereby allow the carriage 23 with its appurtenances to be freely moved to any position upon the frame 22.

To the free overhanging arm 29, is secured a ring sleeve 38 which receives the neck 39, projecting on one side from the frame 40, in which latter the recording diaphragm and stylus are mounted, and this neck 39, with its appurtenances is fixed in any desired position in the ring frame 38, by a clamp screw 41. The free end of the neck 39, projects beyond the ring frame 38, and receives the sound conveying tube 42, which is preferably made flexible, and which has at its free end a mouth-piece 43, the particular construction of which will hereinafter be more fully described.

The disk 4, which is in the nature of a rotary table, has hereinbefore been described and is shown in the drawings as reduced in thickness on that portion of the periphery which overlaps the inner wall of the pan 6, and if this construction is used, the disk 4, must be removable from the shaft 2. It is, however, also practicable to make the disk or revolving table, in two parts, the lower part of which extending only to within a short dis-

tance of the upper edge of the inner wall of the pan, while the upper part extends so that edge to within a short distance of outer wall of the pan. This is indicated by dotted line in Fig. 2, and if this construction is adopted, only the upper thinner part of table is removable from the upright shaft while the lower thicker part of the table must be fixed to that shaft.

When a sound record is to be made, a record tablet of the kind described in my aforesaid Letters Patent, is placed upon the rotary table 4, and this record tablet is represented in the drawings as a circular disk 44, which has central perforation passing over the upper end of the shaft 2. Sometimes it is convenient to interpose between the record tablet and the rotary supporting table a thin disk 45, of felt, or of some other non-resonant material. This, however, is not essential. Upon the record tablet is placed a clamping plate 46, which by preference is provided with a hub 47, which is slipped over the upper end of the shaft 2. This upper end of the shaft 2, is screw-threaded as shown, and a thumb nut 48, is then screwed down upon the hub of the clamping plate, whereby the record tablet is securely fastened in position.

At one end of the base plate 1, there is mounted a standard 49, which may be a support tube as shown, and in which is supported a friction stem 50, projecting from the bottom of a shelf 51, and which in turn supports a vessel 52, containing alcohol. From the bottom of this vessel extends a tube 53, preferably provided at its free end with a flexible nozzle 54; and a stop-cock 55, with which the tube is provided permits the operator to regulate the flow of alcohol from the nozzle. With my present improvement it is necessary that during the whole process of tracing the record, the record tablet be covered with a film of alcohol, and for this purpose a thin stream of alcohol is directed upon the center of the tablet, or rather upon the clamping plate 4 from which the alcohol spreads in all directions by centrifugal force, and flows over into the pan 6. When the tracing of the record has been completed, the clamping plate is removed and the record tablet also is lifted from its support by the insertion between the same of a sharp edge, such as a knife blade, or even by the finger nails of the operator, and is removed for further manipulation as described in my aforesaid Letters Patent, and also for the manipulation which will be described hereinafter.

Only a very small quantity of alcohol is used for producing a single record, but after continued use of the machine a considerable amount of alcohol accumulates in the pan and this is removed by removing the tablet 4 or the upper, thinner part thereof, as the case may be, by inserting a finger in each of the pouring lips 9, and thus lifting the disk or tablet 4, from the shaft 2. The pan is then removed from the bracket 7, and the alcohol



is poured out and preferably back into the vessel 52, by one of the pouring lips.

The recording diaphragm 56, is mounted in the circular frame 40, between a ledge formed on said frame and an annulus 57, screwed down upon the same by screws 58, as shown, or in any other suitable manner. On the rear side of that diaphragm there is applied a small block 59, of hard rubber from which extends radially an arm 60, which at its free end is turned up at right angles, outwardly and into contact with the lever 61, which carries the recording stylus 62.

The block 59, is fastened to the center of the diaphragm by a screw 63, passing through the diaphragm and through a washer 64, applied to the front side of the diaphragm. The head of this screw is faced with a disk 65, of soft rubber, and against the same bears the point of an adjusting screw 66, which is mounted in a perforated disk or spider 67, fixed in the neck 39.

The lever 61 is mounted on a plate 67', formed with a slot 68, through which a set screw 69, fixed in the annulus 57, passes. The plate 67', can thus be adjusted to various positions on the annulus, and is clamped in the adjusted position by a thumb-nut 70. One end of the plate 67' is bifurcated, and screws 71, 71, passing through the legs of the fork, are formed at their ends with bearings for the pivot points of the arbor 72, which is fixed to the lever 61. This lever, is made as light as practicable and as is consistent with rigidity, and the plate 67', together with the lever 61, which it carries, is so adjusted that the upturned end of the arm 60, bears upon the lever at the greatest practicable distance from the axis of the spindle 72, viz: at the free end of the lever. The connection between the lever and the upturned end of the arm 60 is made by a small quantity of pitch, 60', which acts as an efficient cement, and which is applied after the lever has been adjusted to its proper position. This mode of connecting the lever with the arm 60, and thereby with the diaphragm, I have found to be of great advantage for a variety of reasons, but more especially on account of the ease with which the connection is made, and unmade in case of repair, and on account of the damping effect it has upon the lever.

To the end of the lever 61, is secured the recording stylus 62, by soldering or otherwise, with its plane at right angles to the plane of the lever, as shown. The stylus is composed of a flat, and rather thin plate of spring steel, pointed at its free end, and provided with a tracing point 62'', of Iridium. The broad portion of the stylus is damped by one or two bands 72', of soft rubber, which are simply slipped over the same.

By reference to Fig. 4, it will be seen that the lever 61, with the recording stylus 62 extend across the diaphragm upon a line which constitutes a chord but not a diameter of the circle of the diaphragm. They are therefore,

eccentrically mounted with reference to the center of the diaphragm; but notwithstanding this eccentric location, the lever is rigidly connected with the center of the diaphragm and thus receives the maximum amplitude of its vibration. By thus placing the lever with the stylus eccentric with reference to the center of the diaphragm both the lever and the stylus may be and are made shorter than if they were located on the line of a diameter of the diaphragm. This is an important result, since the shorter the lever and stylus, the less liability there is of lost motion, and the less liability there is of extra or spontaneous vibrations of the lever and stylus, and both of these facts conspire to produce an accurate tracing of the sound waves impinging against the diaphragm.

Where the stylus passes over the edge of casing 40, the latter, together with the annulus 57, is cut away upon a straight line, as indicated at 57'. This permits a further reduction of the length of the stylus, since the record tablet may be located close to the straight edge 57'.

The body of the stylus is normally curved downwardly, as shown in dotted lines at 62', but when the diaphragm holder or frame 40, is turned to cause the stylus to impinge upon the record tablet, which is the preparatory step for making a record, the stylus is unbent and becomes straight, as shown in solid lines in Fig. 4, and I have found that the best results are obtained when the stylus is at an angle of about forty-five degrees with the plane of the tablet. The maximum pressure of the stylus upon the record surface is therefore equal to the force required to unbend the stylus. It is very small, because the stylus is made as thin as practicable, and it is uniform for different records and for all parts of the same record.

The mouth-piece, into which vocal sounds are uttered for recording, is shown at 43, in Figs. 1 and 8, and it consists of a bell shaped structure, the small end of which is secured to the sound conveying tube, while the wide, flaring end is turned toward the speaker who applies his mouth to the opening. Near the edge of the mouth opening there is a perforation 43', cut into the wall of the mouth-piece, and this perforation is of such shape and size, and at such distance from the edge of the mouth-piece, as to fit approximately the edge of the nose of the speaker; so that when the mouth-piece is applied, the sounds uttered by the mouth enter the wide, flaring opening, while the sounds uttered by the nose enter the perforation 43'.

In making a record of vocal sounds, it is necessary that all sound waves composing the words or the song be conveyed to the diaphragm, and it has, therefore, been proposed to make mouth-pieces of such size and shape as to admit within the opening both the mouth and the nose of the speaker or singer, and to fit against the face of the user around the

mouth and nose. Mouth pieces of this character are necessarily large and clumsy, and do not readily and comfortably fit different persons, while with my construction the size of the mouth-piece is reduced, and will comfortably fit different speakers.

By means of the apparatus so far described, a record of sound waves is made in the following manner: The spring catch 35, 36, is drawn back, which permits the spring 34, to lift the block 30, from the screw 20, so that the carriage 23, may be freely moved to the left, whereby the stylus 62, is carried beyond the edge of the rotary table 4. A record tablet prepared in the manner described in my aforesaid Letters Patent is then placed upon the table 4, and clamped to the same, as hereinbefore described, and the carriage 23, is moved toward the right until the point of the recording stylus is above the tablet but within the edge of the same. The casing 40, is then turned in its bearing 38, until the point of the stylus impinges upon the tablet and is unbent, as shown in Fig. 4. In this position the casing 40, is clamped by means of the screw 41. The stop-cock 55, is then opened and a thin stream of alcohol is directed upon the clamping disk 46. The wheel 17, is now rotated by means of the crank and handle 16, whereby, by means of the gearing described, the record tablet is rotated, while the stylus is carried across the face of the tablet in a radial line, removing from the tablet a fine spiral line of the fatty etching ground with which it had been covered. Sound waves are now directed against the diaphragm in any desired manner, and if vocal sounds are to be recorded, the sound conveying tube 42, with the mouth piece 43, will be used. The vibrations of the diaphragm thus produced will cause the stylus to make a tracing of an undulatory line, corresponding to the sound waves directed against the diaphragm; all as described in my aforesaid Letters Patent. During this whole time a thin stream of alcohol is delivered upon the plate 46, and the alcohol spreading out in all directions is maintained as a uniform and constantly renewed film upon the tablet. In this manner every part of the record is made under alcohol, and in this respect my present invention differs from the process set forth in my aforesaid Letters Patent.

In accordance with the said patent, alcohol is poured once for all over the tablet, and is allowed to evaporate during the process of recording. I have found that in this manner it often happens that the alcohol has entirely evaporated before the record is completed, so that a portion of the latter is made upon a dry tablet; whereby the accumulation of filamentary particles of dust on the point of the stylus, which the alcohol is designed to avoid, takes place during the production of a portion of the record. With my present improvement this defect is cured, since it maintains the record tablet moist with alcohol from the beginning to the end of the operation.

After the tracing of the record has been completed, the tablet is speedily removed and before the record is fixed by etching as described in my aforesaid patent, the alcohol adhering to the record surface is quickly washed off with water. This is an important step in my improved process and greatly improves the definition of the record by etching. The reason for this is, that the alcohol slightly attacks and dissolves the fatty etching ground, so that the thin film of alcohol remaining upon the tablet, contains a slight quantity of that ground in solution. If now, the film of alcohol is allowed to evaporate an exceedingly small quantity of the dissolved ground is deposited upon the metal which has been laid bare by the stylus. This small deposit of ground sufficiently resists the action of the etching fluid to impair the definition of the final record. By simply pouring water over the record surface immediately after the tablet has been removed from the recording apparatus the film of alcohol and the ground held in solution by the same is removed, and the tracings of the stylus present a clean metallic surface, which is properly attacked by the etching fluid.

The reproducing apparatus as a whole is represented in Fig. 3.

Upon a base board 73, in standards 74, is journaled a shaft 75, upon which are mounted a driven pulley 76, a fly-wheel 77, and a friction disk 78. The latter is in frictional engagement with a rotary table 79, which is mounted upon a vertical shaft substantially in the manner described with reference to the rotary table 4, of the recording apparatus. Fig. 3, being a perspective view, the mounting of the table 79, is not visible, but is easily understood from the foregoing description. The upper surface of the table is preferably covered with a sheet of felt or other elastic and non-resonant material, as indicated by appropriate shading.

Upon the felt covered table 79, the record tablet 44, is placed and is clamped thereon substantially in the manner in which this is done in the transmitting apparatus, *i. e.*, by means of a clamping plate 46, and a thumb-nut 48. A driving wheel 80, mounted on a shaft 81, which is journaled in standards 82, is rotated by means of a crank 83, and handle 84, and gives motion to the table 79, by means of a crossed belt or cord 85. The relation of the table 79, to the friction disk 78, is the same as the relation of the table 4, to the friction disk 12; that is to say, the table rests with the greater part of its weight upon the friction disk, so that the frictional gearing is automatically maintained. A post 86, mounted upon the base-board 73, has swiveled upon its upper end a fork 87, between the prongs of which is pivoted the swinging arm 88, which extends over the table 79, and has at its free end a clasp 89, which receives the neck 90, which projects from the center on one side of the casing 91, of the reproducing



diaphragm 92. This casing with its diaphragm, stylus and appurtenances, which will presently be described, can be thus turned in the clasp, and can be fixed in any adjusted position by a clamp screw 93.

Upon the end of the neck 90, which projects beyond the clasp 89, is slipped a flexible tube 94, which in turn receives the small end of a sound conveying trumpet 95, the flaring end 96 of which is turned toward the listener. A bracket 97, secured to the swinging arm 88, carries at its free end an elastic fork 98, which receives and supports the trumpet, and the parts are so proportioned that the free end of the swinging arm preponderates, so that the point of the reproducing stylus, which will presently be described, presses rather firmly upon the record tablet.

It will now be understood, that when a record tablet, having a record of sound waves upon its surface, produced in accordance with my invention, is mounted upon the table 79, and when the point of the stylus is adjusted in engagement with the record groove, and the wheel 80, is rotated, the rotating record groove will guide the stylus across the face of the tablet, and will at the same time vibrate the stylus and diaphragm in accordance with the undulations of the record groove. The sound waves thus produced by the diaphragm will issue from the flaring opening of the trumpet, and the sounds will be heard by a listener in front of the trumpet, or in its vicinity.

The reproducing diaphragm is mounted in the casing 91, in the usual manner, being held against a ledge by means of an annulus 99. On this annulus is formed a swelling or block 100, and diametrically opposite to the same the stylus carrying spring 101, is fastened to the annulus, and extends across the face of the diaphragm and beyond the edge of the annulus. This spring 101, is a leaf spring which faces with its flat side the face of the diaphragm up to a point beyond the center of the latter, and is then twisted at right angles, as indicated at 102, and crosses the annulus edgewise as shown at 103. The tendency of the part 101, of the spring is to press toward the diaphragm, whereby the edge of the part 103, is made to bear with some force upon the annulus 99; and the tendency of the part 103, is to press against the swelling or block 100. The spring is therefore elastic in two directions at right angles to each other.

In order to prevent grinding of the spring against the annulus and against the block 100, a U-shaped piece 104, of soft rubber embraces the outer portion 103, where it bears upon the annulus and against the block. This soft rubber cushion also serves as a dampener for the spring. At the point where the spring passes over the center of the diaphragm, it has a perforation 105, and a screw pin 106, secured to the center of the diaphragm by two nuts 107, 108, extends loosely through the perforation. A thumb-nut 109, also placed on the screw-pin 108, and a soft rubber washer

110 between the thumb-nut and the spring serve to regulate the tension of the latter and of the diaphragm, as will be readily understood.

On the free end of the spring 101, 103, there is secured a binding post 111, in which the stylus 112, is held by the set screw 113, and may be adjusted to project to the required distance beyond the end of the spring. This stylus is preferably made of hard steel. It has a slender point, but the point should not be so sharp as to cut the bottom of the record groove which it engages.

In the operation of reproducing the sounds recorded on a tablet, the stylus is guided by the walls of the record groove, and not by the bottom of the same. Consequently it is not essential that the point of the stylus be in contact with the bottom of the groove. In fact it is preferably not in contact with the same, so that this point may be made rather dull.

The sounds emitted by the reproducing diaphragm are very powerful and ordinarily too loud to be received with comfort by a listener in front of the trumpet or other receiving tube. For this reason I have found it sometimes necessary to reduce the volume of the emitted sound before it reaches the ear, and this I accomplish by one or more perforated and exchangeable diaphragms 114, placed in the neck 90. These diaphragms should be made of some non-resonant material like soft rubber, or cork, as indicated by appropriate shading.

Having now fully described my invention, I claim and desire to secure by Letters Patent—

1. The method of recording vocal and other sounds which consists in removing from a record tablet covered with a fatty film, undulatory lines of said film by, and in accordance with the sound waves and maintaining at the same time a layer of a fluid over the film, substantially as described.

2. The method of recording vocal and other sounds upon a rotating disk covered with a fatty film which consists in spreading over said film and continuously renewing over the same a layer of a fluid and at the same time removing from said tablet undulatory lines of the fatty film by and in accordance with the sound waves, substantially as described.

3. The improvement in the art of making a gramophone record which consists in immersing and maintaining the tablet and the point of the recording stylus in alcohol during the process of recording, substantially as described.

4. The improvement in the art of making and fixing a gramophone record which consists in removing from a tablet covered with a fatty film undulatory lines of said film by and in accordance with sound waves while said film is covered with a layer of alcohol; then immediately removing the alcohol with water and then subjecting the tablet to the

tion of an etching fluid, substantially as described.

5. The method of reproducing sounds from record of the same which consists in vibrating a stylus and propelling the same along a record by and in accordance with the said record, substantially as described.

6. In a gramophone, a recording stylus pressing by its own elasticity upon the record tablet at right angles to the plane of its vibratory movements and consisting of a leaf spring terminating in a point of harder material than that of the body of the stylus, substantially as described.

7. In a gramophone, the combination of a sound receiving diaphragm and an elastic recording stylus controlled by the diaphragm and adjustable with reference to a record tablet so as to press by its own elasticity upon the same at right angles to the plane of its vibratory movements, substantially as described.

8. In a gramophone a recording stylus pressing by its own elasticity upon the record tablet at right angles to its plane of vibratory movements, and consisting of a leaf spring terminating in an iridium point, substantially as described.

9. In a gramophone, a recording stylus composed of a leaf spring terminating in a tracing point in combination with one or more elastic non-sonorous dampers, substantially as described.

10. In a gramophone a recording stylus formed of a leaf spring terminating in a tracing point in combination with one or more sleeves of soft rubber upon the leaf spring for damping the same, substantially as described.

11. In a gramophone, the combination of a sound receiving diaphragm, a lever and a recording stylus carried by the same, both extending parallel but eccentrically over the diaphragm; with a connection between the center of the diaphragm and the lever, substantially as described.

12. In a gramophone, the combination of a sound receiving diaphragm a lever and a recording stylus carried by the same, both extending over the face of the diaphragm but eccentrically thereto, with a rigid connection between the center of the diaphragm and the free end of the lever, substantially as described.

13. In a gramophone, the combination of a circular sound receiving diaphragm, a lever and an elastic recording stylus both extending parallel with the diaphragm on the line of a chord, with a rigid connection between the center of the diaphragm and the free end of the lever, substantially as described.

14. In a gramophone, the combination of a sound receiving diaphragm, a lever and an elastic stylus carried by the same, both extending parallel, but eccentrically thereto; with a bracket rigidly connected with the center of the diaphragm and removably ce-

mented to the lever, substantially as described.

15. In a gramophone, the combination of a sound receiving diaphragm mounted in a suitable frame, a bracket adjustably mounted on said frame, a lever pivoted in said frame extending parallel to and eccentrically with reference to the center of the diaphragm, and an elastic recording stylus carried by the lever; with a mechanical connection between the center of the diaphragm and the free end of the lever, substantially as described.

16. In a gramophone a sound receiving diaphragm and a tube for conveying sound waves thereto in combination with a recording stylus receiving motion from the diaphragm, and a screw mounted in the sound conveying tube bearing centrally upon the diaphragm for adjusting the tension of the latter, substantially as described.

17. In a gramophone, the combination of a horizontal rotary table adapted to support a record tablet, and a vertical shaft free to move longitudinally, carrying the table; with a friction disk engaged by the under side of the table for rotating the latter, substantially as described.

18. In a gramophone the combination of a horizontal rotary table mounted upon a vertical shaft and adapted to support a record tablet; with a friction disk engaging the under side of the table and partly sustaining the weight of the table, whereby the latter is automatically maintained in frictional gear with said disk, substantially as described.

19. In a gramophone, the combination of a rotary horizontal table adapted to receive and support a flat record tablet; with a reservoir of a suitable fluid, such as alcohol, discharging upon the center of the table and tablet, and an annular pan disposed underneath the table for receiving the overflow of alcohol, substantially as described.

20. In a gramophone the combination of a horizontal rotatable table adapted to receive and support a record tablet; with a reservoir of alcohol discharging upon the center of the table and tablet, an annular pan disposed under the edge of the table for receiving the overflow of alcohol, and a friction disk bearing upon the under side of the table between the center of the same and the inner wall of the pan, substantially as described.

21. In a gramophone, the combination of a horizontal rotary table adapted to receive and support a record tablet, a recording diaphragm and stylus connected by gearing with the table to move radially over and with the stylus in operative relation to the same, substantially as described.

22. In a gramophone, the combination of a horizontal rotating table adapted to receive and sustain a flat record tablet, with a carriage movable in a line parallel to a radius of the table, a recording diaphragm and stylus carried by the carriage with the stylus in operative contact with the record tablet, and



gearing connecting the table with said carriage, substantially as described.

23. In a gramophone, a sound conveying tube provided with a mouth piece having a flaring opening for the application of the mouth of the speaker and a perforation in the side wall of the mouth piece separated from and spaced with reference to the mouth opening and shaped to correspond to the shape of the nostrils of the speaker, substantially as described.

24. In a gramophone a sound reproducing diaphragm in combination with a stylus lever extending diametrically across the same, and elastic in two directions at right angles to each other, substantially as described.

25. In a gramophone, the combination of a diaphragm and a stylus carrier composed of a leaf spring twisted at one point so as to bring the edge of one portion at right angles to the face of the other portion, whereby it is elastic in two directions, substantially as described.

26. In a gramophone the combination of a reproducing diaphragm and stylus; with a stylus carrier composed of a leaf spring extending flat-wise over the face of the diaphragm and edgewise over the edge of the diaphragm, substantially as described.

27. In a gramophone the combination of a reproducing diaphragm mounted in a suitable frame the latter being provided at one point with a boss or stop; with a double elastic stylus carrier composed of a twisted leaf-spring tending toward the diaphragm and against the boss or stop, substantially as described.

28. In a gramophone, a reproducing diaphragm and stylus in combination with an elastic stylus carrier extending over the face of the diaphragm and tending toward the same, of an adjustable connection between the diaphragm and stylus carrier and adjustable for varying the pressure between diaphragm and style carrier, substantially as described.

29. In a gramophone the combination of a reproducing diaphragm mounted in a suitable frame provided with a boss or stop; with a

double elastic stylus carrier tending toward the diaphragm and toward the stop, and elastic non-resonant dampers interposed between the style carrier and the diaphragm and between the style carrier and the frame and stop, substantially as described. 50

30. In a gramophone a sound reproducing diaphragm and a sound conveying tube for the same, with one or more non-resonant perforated diaphragms in the said tube for reducing the volume of sound conveyed to the ear substantially as described. 55

31. In a gramophone a recording stylus pivoted to move in response to the vibrations of a diaphragm and elastic in a plane at right angles to such motions, substantially as described. 60

32. In a gramophone, a reproducing stylus having a wedge-shaped point engaging the walls of the record groove, substantially as described. 65

33. In a gramophone reproducer, a stylus carried or formed by a spring fixed at one end to the diaphragm holder and freely extending across and beyond the same and operatively connected with the center of the diaphragm, substantially as described. 70

34. In a gramophone reproducer, a spring constituting or carrying a stylus, fixed at one end to the diaphragm holder and extending across and beyond the periphery of the same and freely pressing against the diaphragm, substantially as described. 75

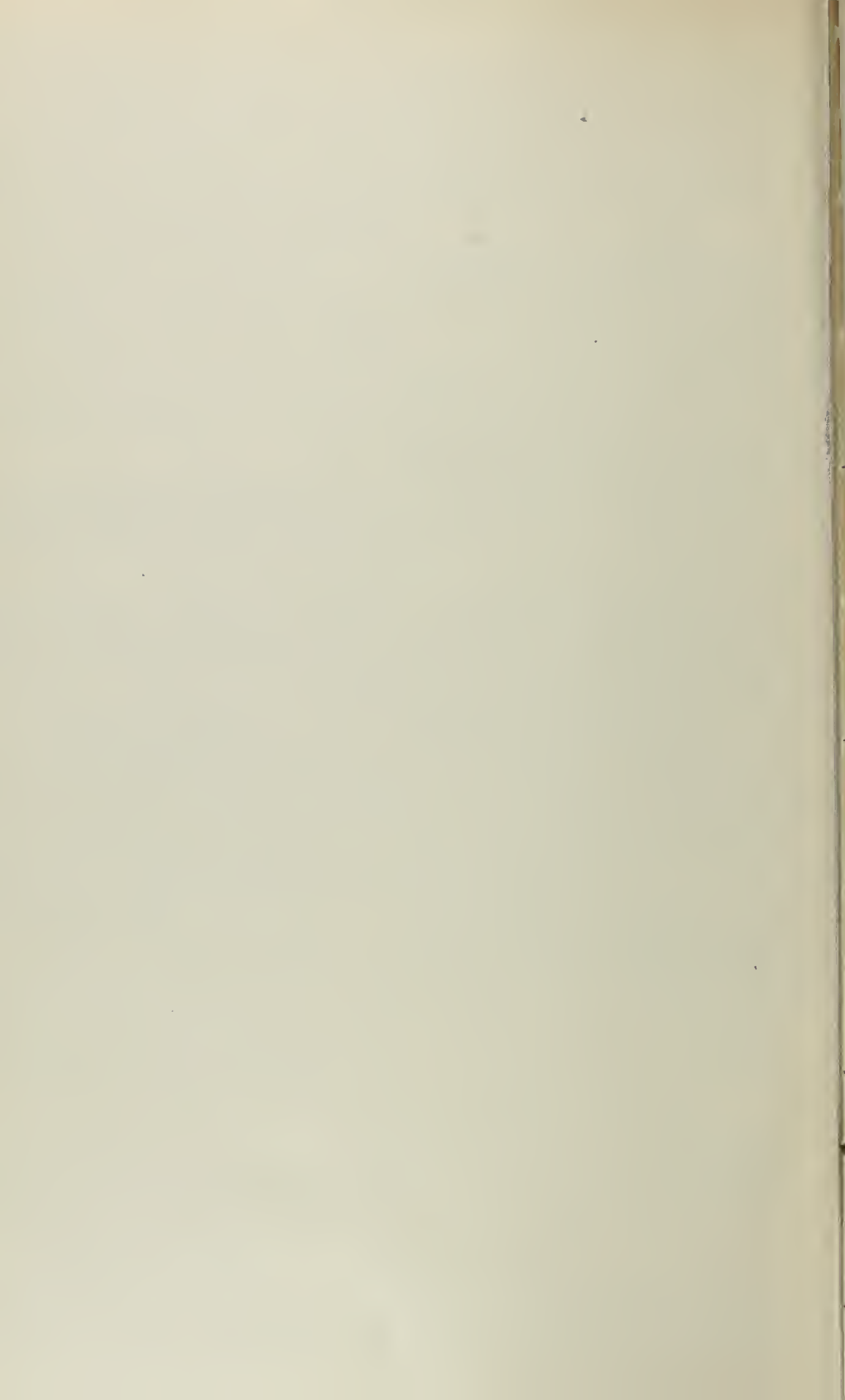
35. In a sound reproducing apparatus consisting of a traveling tablet having a sound record formed thereon and a reproducing stylus shaped for engagement with said record and free to be vibrated and propelled by the same, substantially as described. 80

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 85

EMILE BERLINER.

Witnesses:

HENRY E. COOPER,  
F. T. CHAPMAN.





F. MYERS.  
GRAPHOPHONE.

(Application filed Dec. 15, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

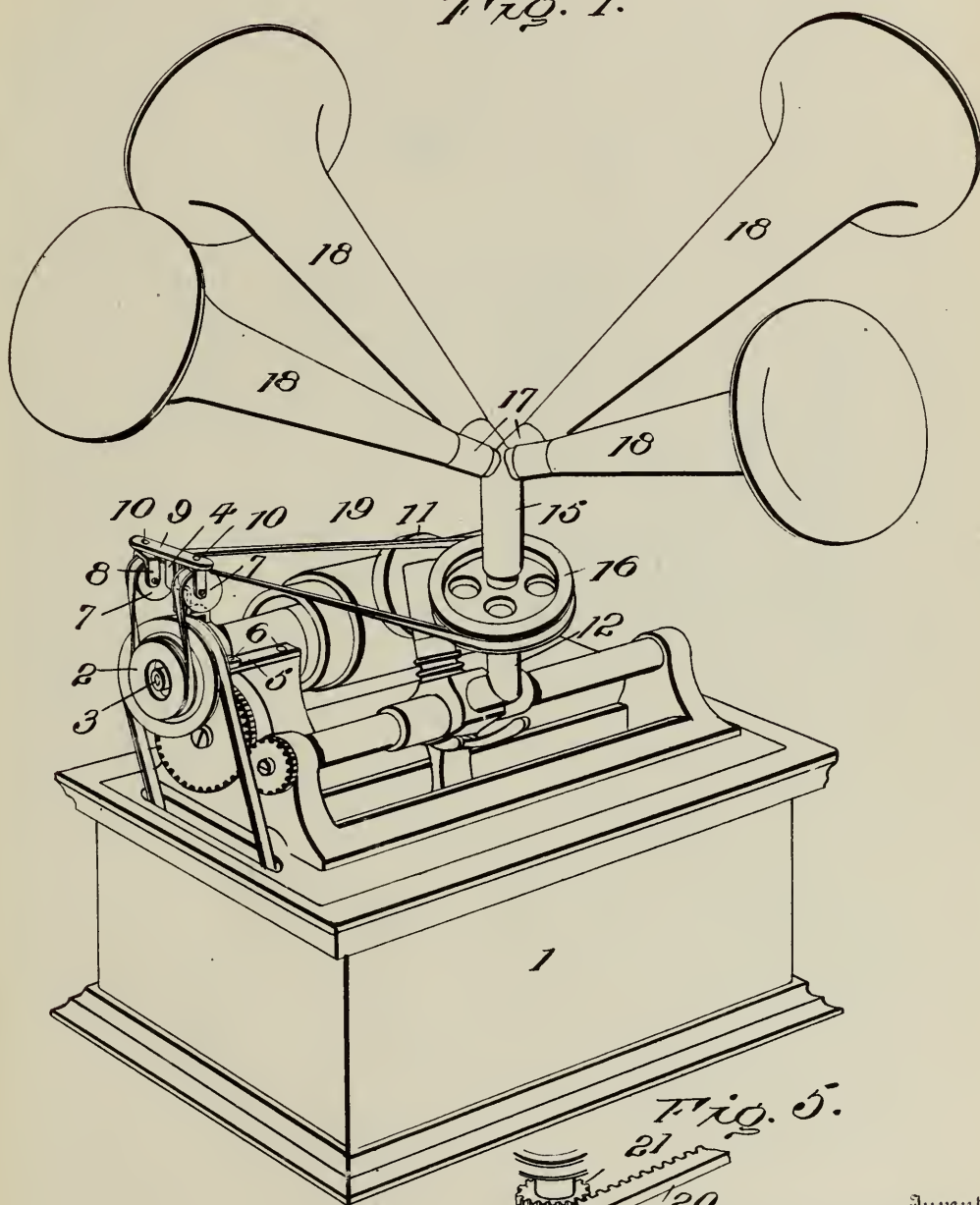
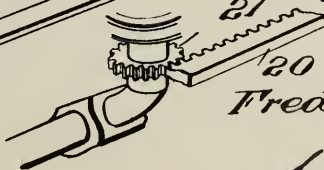


Fig. 5.



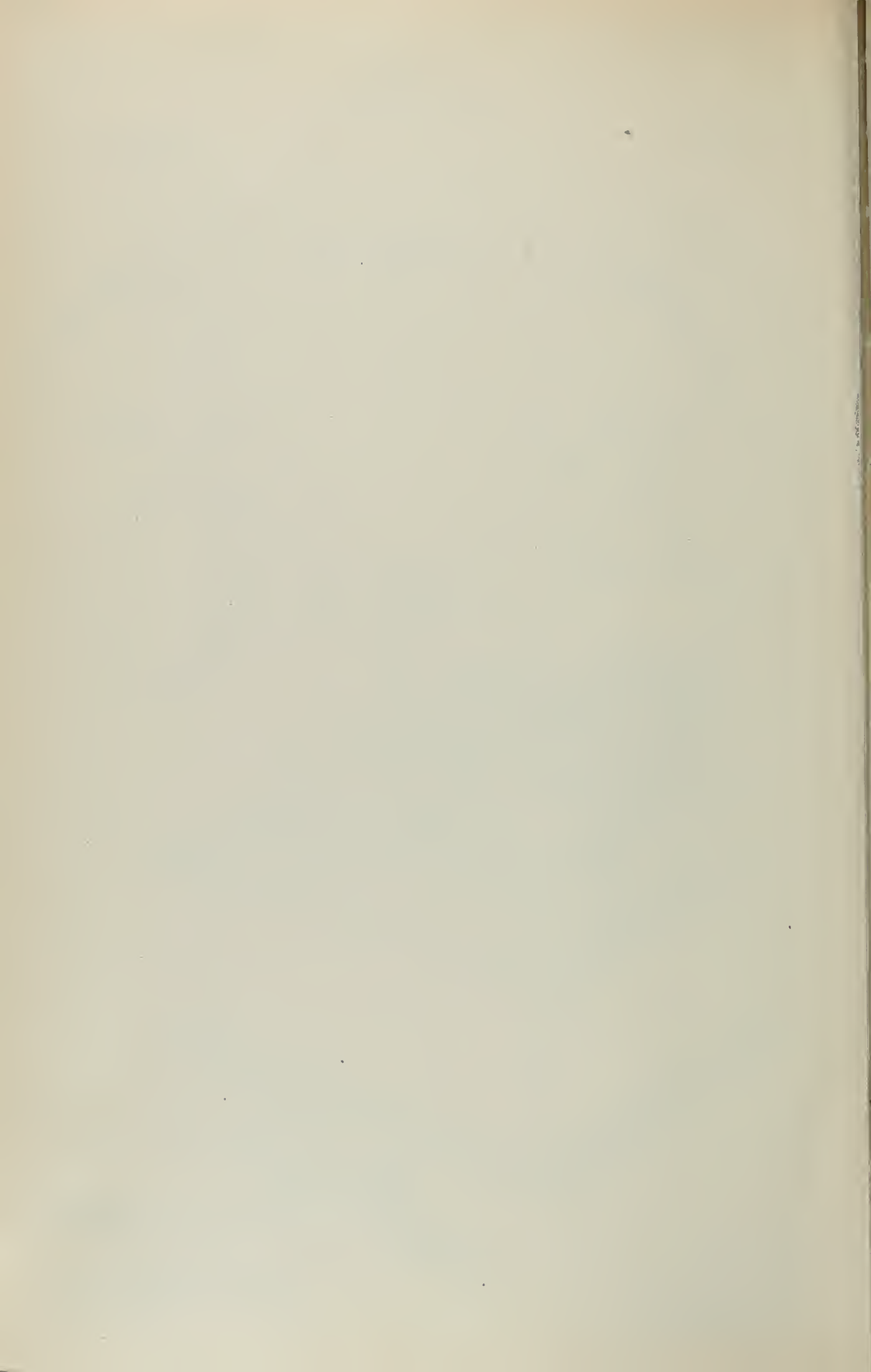
Witnesses

Jos. Imrie  
F. J. Hartman

Inventor

Frederick Myers

by E. J. Denny & Co.,  
his Attorney

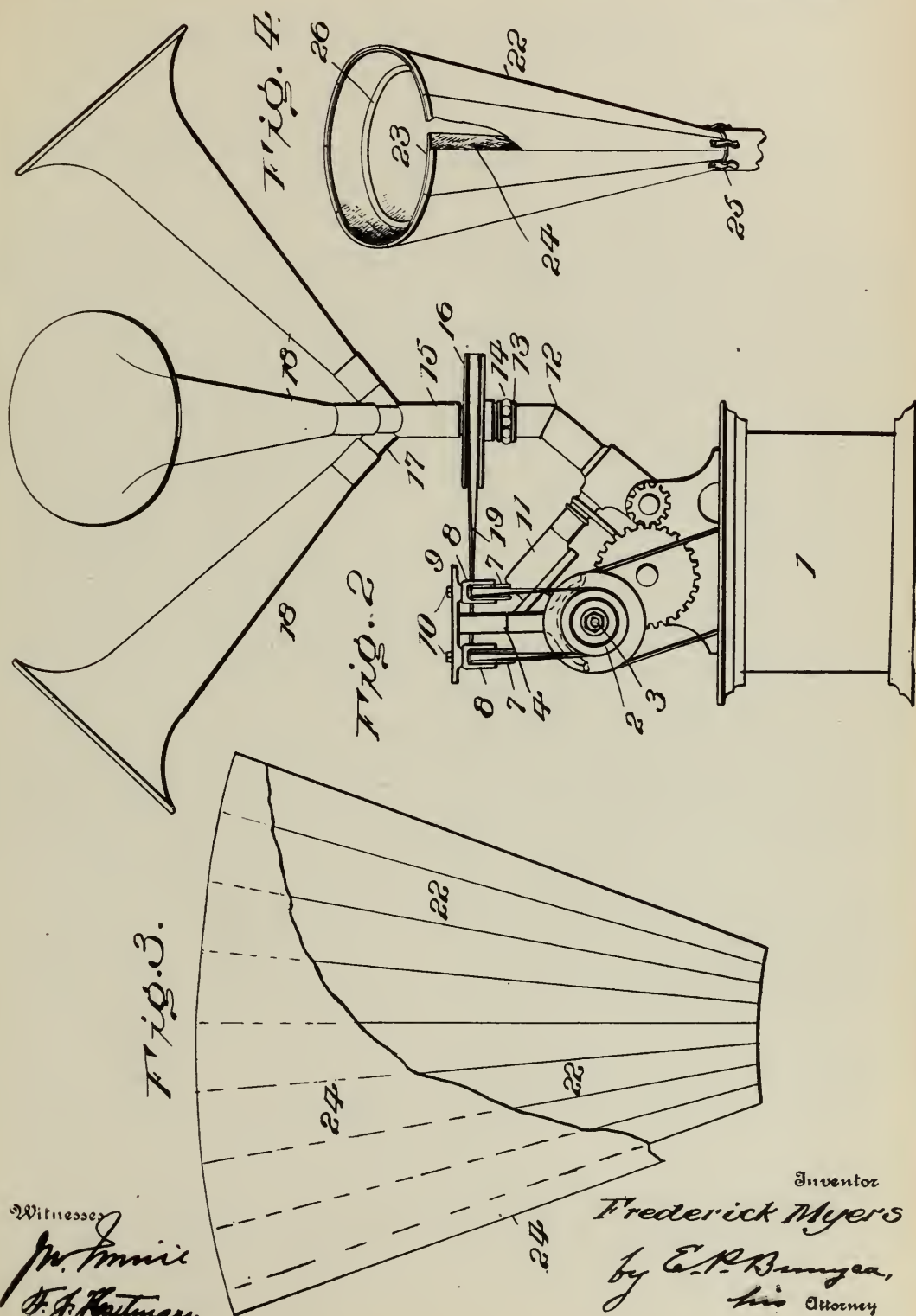


F. MYERS.  
GRAPHOPHONE.

(Application filed Dec. 15, 1899.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses  
J. M. Smith  
F. J. Hartman

Inventor  
Frederick Myers  
by E. P. Brinza,  
his Attorney



# UNITED STATES PATENT OFFICE.

FREDERICK MYERS, OF NEW YORK, N. Y.

## GRAPHOPHONE.

SPECIFICATION forming part of Letters Patent No. 647,147, dated April 10, 1900.

Application filed December 15, 1899. Serial No. 740,481. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK MYERS, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Sound Transmitters or Disseminators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to sound transmitters or disseminators for phonographs, megaphones, and similar devices; and the objects of the same are to produce a device designed to be attached to any ordinary sound-producing instrument and which will project or disseminate the sound in all directions radially from the instrument.

The defects heretofore existing in sound-reproducing instruments of the class referred to are to a great extent due to the fact that the sound is usually projected in one direction only, and while the horn or tube through which the sound is transmitted may be adjusted to project the sound in any one direction persons sitting outside the range of the horn or tube do not get the full volume or force of the music or other reproduction.

By my invention the defects referred to are entirely remedied, as by its use an audience seated in a circle around the instrument can hear equally well, the reproduction being of the same volume and scope at all points from the instrument outward. I am also enabled to produce a peculiar and pleasing effect in certain classes of music to be reproduced, said effect consisting in giving a vibratory swell or variable sound-wave character to the music, owing to the revolution given to the transmitter horns or tubes. The usual metallic or grating sounds in phonographic reproductions are to a great extent absorbed and obviated by my invention, and certain classes of music are rendered in a greatly-modulated tone and in well-measured and uniform time, owing to the fact that the revolving horns act as a speed-regulator for

the instrument and at the same time distribute the sound equally at all points around the machine.

Figure 1 is a perspective view of a graphophone having my attachment connected thereto and showing four horns or transmitter-tubes. Fig. 2 is an end view of the same, three horns or tubes being shown. Fig. 3 is a plan view of a blank for one of the horns or tubes which I may use. Fig. 4 is a perspective view of a horn or tube made from said blank. Fig. 5 is a detail perspective of a modification in the means employed for actuating or revolving the horns or tubes.

Like numerals designate like parts wherever they occur in the different views.

Referring now to Figs. 1 and 2, the numeral 1 designates a graphophone of the well-known type. Beyond placing a small pulley 2 upon the end of the record-shaft 3 no alterations or changes are made in the structure of instruments of this character. A small upright bracket 4, having feet 5 attached by screws 6 to a permanent part of the instrument, serves as a support for two idlers 7, journaled in hangers 8, pivoted at the opposite ends of a cross-bar 9 upon the ends of the screws or bolts 10. To the usual short section of tubing projecting out from the lower portion of the reproducer 11 is a tubular elbow 12, having a flange 13 surrounding its vertical portion. This flange serves as a support for a ball-bearing 14 of suitable construction, said ball-bearing being attached to a tubular section 15, having a pulley 16 rigidly connected thereto. The upper end of the tubular section 15 has three or more radially-projecting tubular nipples 17, to which the horns or tubes 18 are connected. An elastic or india-rubber band 19 passes under the pulley 2, up and over the idlers 7, and around the pulley 16.

The operation of my invention as thus far described is as follows: The reproducer 11 having been set or placed in position to start at the beginning of the record-tube the starting-lever is moved to actuate the record-shaft 3. Motion is thus imparted to the pulley 2, around which the elastic band 19 passes, and from thence the revolution is communicated to the idlers 7 and to the pulley 16, with which



the horns or tubes 18 revolve. As the reproducer 11 moves from one end of the record-tube to the other to reproduce the piece of music or other record the elastic band 19 is elongated to the extent required, and the horns or tubes 18 are thus revolved during the entire time the shaft 2 revolves. The band 19 being small and quite elastic does not absorb but little power, and as the idlers 7 are journaled in swiveled hangers they turn to direct the elastic band in a straight line to the pulley 16 and create but little friction.

As shown in Fig. 5, a rack and pinion may be used for giving revolution to the horns. The rack 20 may be attached in any suitable manner to the casing of the instrument and supported at the required height to be engaged by a pinion 21 on the tube 15. As thus arranged when the reproducer moves from end to end of the record-tube the pinion 21 engages the rack 20 and the horns 18 are revolved.

It will be obvious from the foregoing that my attachment is quite simple and inexpensive, can be quickly applied to any sound-producing instrument of the class referred to, and will project the sound outward in all directions from the instrument. The horns or tubes being connected directly to the reproducer and extending radially outward have a tendency to give the entire force or volume to the production, even though the horns were permitted to remain stationary, and for some classes of music it is deemed equally as effective to permit the horns to remain stationary by throwing the elastic band 19 off the pulley 16. Again, for certain productions I have found that a single horn if revolved will give a peculiar combined modulated and swelling effect. When stationary, I have found that at least three horns are necessary to give good results and to project the sound equally from the instrument outward.

As shown in Figs. 3 and 4, the horn or tube which I may use is made of cardboard or similar light and durable material, and such tubes may be made to occupy but little space in shipping and at the same time be inexpensive and very efficient in use. When thus made, I take a piece of cardboard and score or crease it at intervals, or a sufficient number of strips 22 of cardboard or similar material and lay them edge to edge and attach to one or both faces thereof a piece of textile fabric 23, permitting one edge 24 of the fabric to project beyond the outer strip of the series. This edge may be ready gummed, so that the tube can be readily finished by moistening the gummed edge and attaching it to the opposite edge to complete the tube, or I may use other means for securing the edges. These tubes may thus be shipped flat or folded and can be easily made up by the purchaser.

able to the reproducer-nipples any suitable number of spring-fingers 25 may be connected to the small end of the tube, and a wire ring 26 may be inserted into the large end of the tube to give the necessary strength to the device, or I may use a flat or flanged ring for the end of the tube. Tubes made in this way may have a coating of aluminium paint or bronze to give them a metallic luster.

I have found that tubes or horns made of a non-metallic material have a tendency to obviate the screeching sound so common in phonographs, and, besides, their lightness in weight makes them particularly desirable for my purpose.

Certain changes in the details of construction may be resorted to without departing from the spirit and scope of my invention. Hence I do not wish to be understood as being restricted to the details shown and described.

I claim—

1. In a sound-reproducing instrument, a sound-producer, a horn or tube connected to said producer, and means for revolving said horn or tube during the operation of the instrument.

2. In a sound-reproducing instrument, a sound-reproducer, a plurality of horns attached thereto, and means for revolving said horns during the operation of the instrument.

3. An attachment for sound-reproducing instruments, comprising a plurality of horns connected to a tubular section, and means for revolving said tubular section.

4. In a sound-reproducing instrument, a tubular section, a pulley secured thereto, a plurality of horns attached to said tubular section, a belt or band passing around the pulley and around a pulley revolved from the record-shaft.

5. In a sound-reproducing instrument, a plurality of horns secured to a hollow tubular section and projecting outward and upward from the upper end thereof, hollow connections from said tubular section to the reproducer, and means for revolving said tubular section.

6. In a sound-reproducing instrument, a tubular section having a plurality of horns projecting radially from its upper end, a pulley on said tubular section, a rubber band passing around said pulley and around idlers revolved from the record-shaft, and means for revolving the pulley, substantially as described.

7. In a sound-reproducing instrument, a reproducer, a tubular elbow attached to the nipple of said reproducer, a tubular section connected to said elbow, and a plurality of horns extending radially outward from said tubular section, and means for revolving the tubular section during the operation of the instrument.

8. In a sound-reproducing instrument, a reproducer, a tubular elbow connected to



said reproducer, said elbow having a vertically-disposed member, a tubular section connected to said vertical member, a plurality of horns extending radially outward from said tubular section, and means for revolving said tubular section during the operation of the instrument.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK MYERS.

Witnesses:

FRANCIS C. NYE,

JOS. H. S. THOMAS.



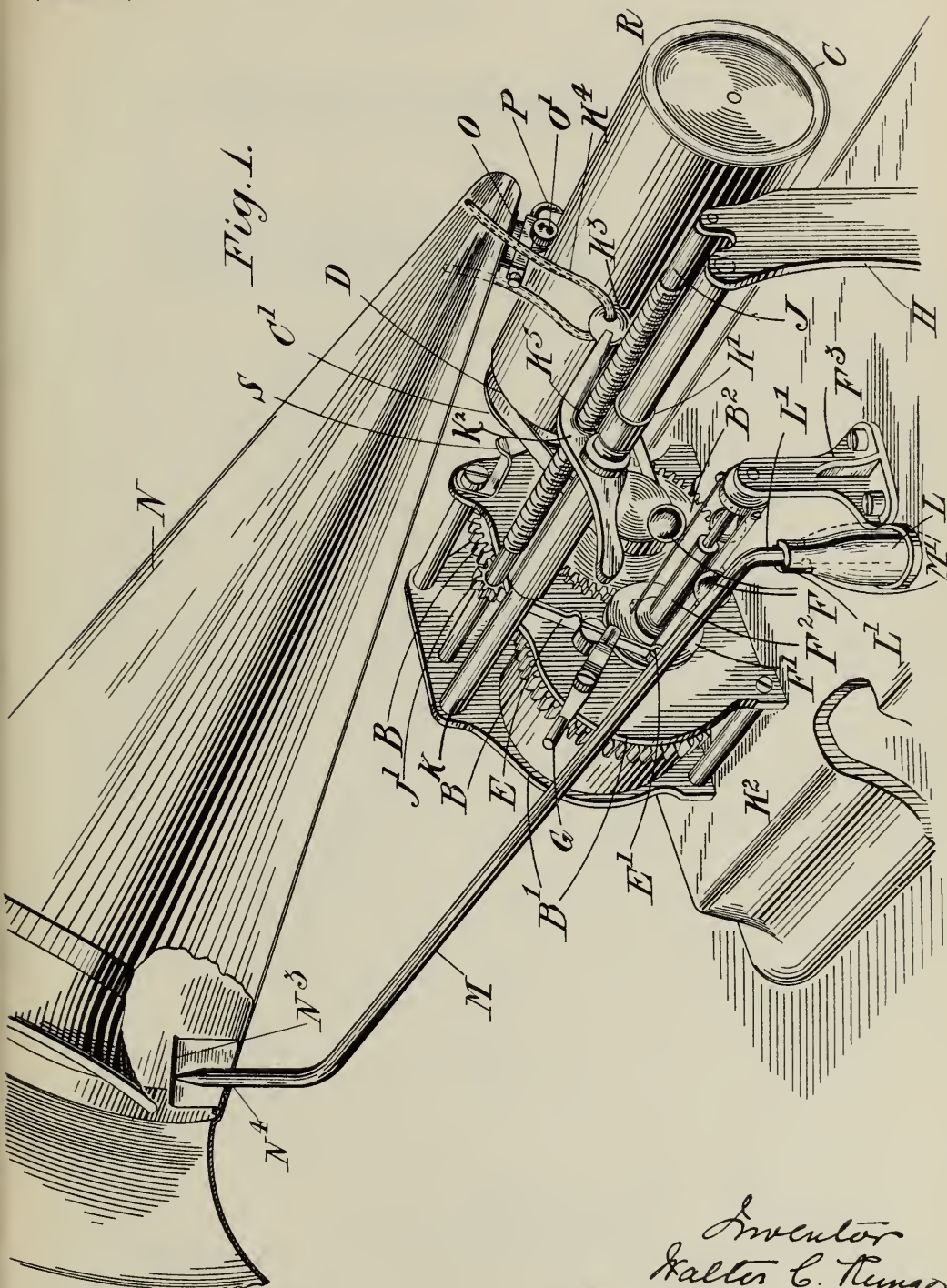
W. C. RUNGE.

GRAPHOPHONE, PHONOGRAPH, OR THE LIKE.

Application filed June 3, 1901.

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
Sam. Gellman, Jr.  
 J. J. M<sup>c</sup>Carthy,

Inventor  
Halter C. Kungo  
by Loew. Freeman  
Attorneys



No. 692,363.

Patented Feb. 4, 1902.

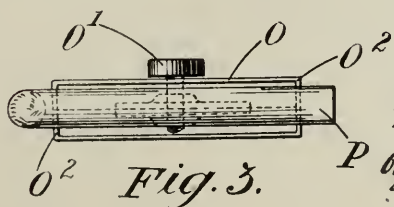
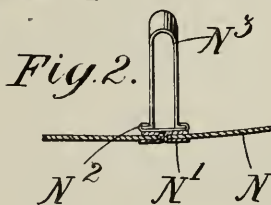
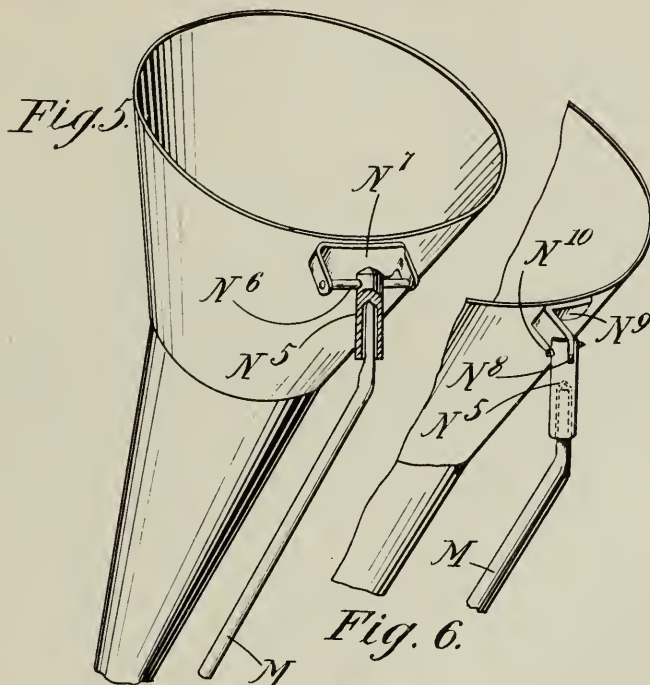
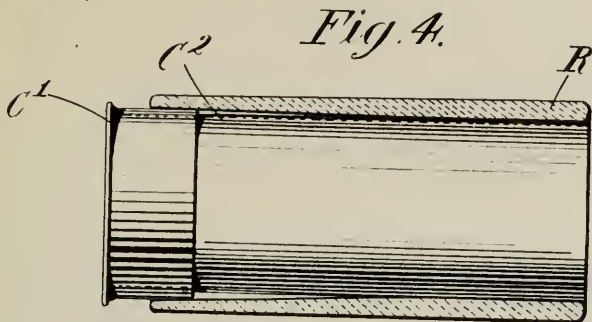
W. C. RUNGE.

GRAPHOPHONE, PHONOGRAPH, OR THE LIKE.

(Application filed June 3, 1901.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses  
*Am. Gillman, Jr.*  
*J. J. McCarthy.*

Inventor  
*Walter C. Runge*  
 by *John Sherman*  
 Attorneys.





## UNITED STATES PATENT OFFICE.

WALTER C. RUNGE, OF LONDON, ENGLAND.

## GRAPHOPHONE, PHONOGRAPH, OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 692,363, dated February 4, 1902.

Application filed June 3, 1901. Serial No. 62,991. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER C. RUNGE, a citizen of the United States of America, residing at London, England, have invented certain new and useful Improvements in or Relating to Graphophones, Phonographs, or the Like, (for which application has been made in Great Britain under No. 9,727, dated May 10, 1901,) of which the following is a specification.

This invention relates to graphophones, phonographs, and other like instruments for reproducing sounds from records, its object being the construction of an instrument which, while thoroughly efficient in operation, is simple and cheap to manufacture.

The improvements are primarily applicable to instruments which are not provided with a diaphragm at the small end of the trumpet, but have a stylus of hardened material attached to some part of the trumpet, the point of this stylus following the channels or grooves of the record in the well-known way. It is, however, to be understood that the improvements are not necessarily restricted to this particular type of instrument.

In the accompanying drawings, Figure 1 is a perspective view of one construction of graphophone embodying the improvements according to this invention. Figs. 2, 3, and 4 are detailed views showing portions of the instrument separately, and Figs. 5 and 6 are perspective views showing alternative constructions of another portion of the instrument.

Like letters indicate like parts throughout the drawings.

With reference first to Fig. 1, A is a base-plate, preferably of cast metal of considerable thickness, so that it may be heavy and rigid. Upon this base is fixed a motor, comprising in the example illustrated a train of wheels B, mounted between two plates B', one member B<sup>2</sup> of the train being preferably of hard fiber or other non-metallic material. From this motor a record-carrying mandrel C is driven by means of a belt D and a pulley C'. The train of wheels forming the motor is driven from a spring coiled in a barrel B<sup>3</sup> and wound up when necessary, and the rate of rotation of the record-mandrel C may be regulated by a lever E, controlled by a screwed

rod or other mechanism. (Not shown in the drawings.) One end of this lever E is furnished with a brake-block E'—say of leather—which presses against a disk F', connected to governors F, the action of the governors being to draw the disk F' away from the plate B' along a rod F<sup>2</sup>, supported between the plate and a standard F<sup>3</sup>, secured to the base A. A lever G is provided, by means of which the motor may be started and stopped.

Mounted free to turn between the outer plate B' and a standard H is a fine-threaded screw J, provided with a pinion J', which is driven from one of the wheels B. Parallel to this screw J and also held between the plate B' and the standard H is a rod K, which forms a guide upon which a sleeve K' can travel and turn. This sleeve K' forms part of a pivoted guide-carrier comprising also a lever K<sup>2</sup>, a head K<sup>3</sup>, and a guide-fork K<sup>4</sup>, the arms of the latter being covered with rubber tubing or other soft or yielding material. Normally the guide-carrier K<sup>2</sup> K<sup>3</sup> lies upon the fine-threaded screw J, as shown in Fig. 1, and it is provided with a knife-edge K<sup>5</sup> or otherwise adapted to engage with the thread of the screw J, so that when the latter rotates the guide-carrier may be caused to travel along the bar K.

Upon the base-plate A is a socket L, having a central vertical hole which accommodates the end of a rod M, the pointed extremity of which serves as a pivot to support the larger end of a sound-trumpet N. Slots L' are provided in the socket L, and pins M' upon the rod M engage with these slots when the rod M is in the socket, thus securing a definite position for the pivot of the sound-trumpet.

The sound-trumpet N may be made of any suitable material, preferably non-metallic—such, for instance, as tough paper, thin fiber, or celluloid. When sheet material, such as celluloid, is employed, the trumpet is conveniently made by providing the edges of the sheet with metal strips or grips, as shown at N' in Fig. 2, these strips being joined—say by soldering. In some constructions only one strip is used, its edges being turned over, so as to grip the edges of the sheet material of which the trumpet is formed. To the strips N' inside the larger end of the trumpet is at-

tached a small clip  $N^2$ , forming a slide, into which the edges of a U-shaped piece of metal  $N^3$  are inserted. The pointed end of the rod  $M$  passes through a hole  $N^4$  and rests against the inside of the curved portion of the U-shaped piece  $N^3$ . This U-shaped member is preferably formed so that the longitudinal portion which rests upon the point of the rod  $M$  is approximately horizontal, thus obviating the danger of any binding action taking place.

Near the smaller end of the trumpet  $N$  a socket  $O$  is provided to accommodate the stylus  $P$ , which may be of any hard material—say, for instance, glass rod or tubing. The socket  $O$  is preferably formed of spring metal and provided with a screw  $O'$ , so that the stylus may be securely gripped. In the construction shown in detail in Fig. 3 the ends of the socket are turned in, as at  $O^2$ , so that the stylus is gripped by each end of the socket, the clamping-screw  $O'$  being in the middle.

In operation the larger end of the trumpet is pivoted, as above described, on its supporting-rod  $M$ , the smaller end passes between the arms of the fork  $K^1$  of the pivoted carrier, and the point of the stylus  $P$  rests upon a record-cylinder  $R$ , which is mounted friction-tight upon the mandrel  $C$ . This mandrel may be made, as shown in Fig. 4, of a piece of light tubing  $C^2$ , the diameter of which corresponds to that of the smaller end of the coned interior of the record  $R$ . At one end the tube  $C^2$  is secured to a ring which fits the inside diameter of the larger end of the record  $R$  and conveniently forms part of the pulley  $C'$ . This ring may, if desired, be slightly coned in order to fit the adjacent portion of the interior of the record.

It is to be understood that the apparatus is so constructed that the point of the stylus  $P$  rests with a slight amount of pressure upon the record  $R$ . The guide-carrier  $K^2$   $K^3$  and fork  $K^4$  are not intended to take the weight of the trumpet, their function being primarily to act as a guide for the smaller end of the trumpet and prevent any danger of the point of the stylus quitting the grooves or channels in the record.

In order that the point of the stylus  $P$  may be withdrawn from contact with the record  $R$  or any adjacent part of the mechanism when the instrument is not in use, a small safety catch or bracket  $S$  is provided, attached to one of the plates  $B'$ . By depressing the back end of the carrier-lever  $K^2$  the knife-edge  $K^5$  is disengaged from the screw  $J$  and the lower end of the trumpet, with the stylus  $P$ , is lifted in the guide-fork  $K^4$ , and the head  $K^3$  is then allowed to rest in the catch  $S$ , in which position the stylus is out of contact with adjacent portions of the instrument.

The rest or catch is not necessarily in the form of the bracket  $S$ . It may, for example, be formed by causing the arms of the fork  $K^4$  to approach one another in a V shape below

when the back end of the lever  $K^2$  is depressed this contracted or V-shaped part of the fork engages with, say, the back of the stylus-clip and lifts it, with the trumpet, clear of the record.

Figs. 5 and 6 show portions of sound-trumpets made according to an alternative construction of this invention. In each of these forms a pivoted socket  $N^5$  is provided, which accommodates the pointed end of the rod  $M$ . In Fig. 5 this socket is shown provided with a cross-arm  $N^6$ , which is journaled in the downturned ends of a plate  $N^7$ , attached to the trumpet. In the form shown in Fig. 6 the socket  $N^5$  is slotted, as at  $N^8$ , and in this slot is a lug  $N^9$ , secured to the trumpet, the lug and the slotted socket being pivotally connected by a pin  $N^{10}$ .

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet and pivotal means for supporting its larger end, means for supporting its smaller end, a pivoted guide for the smaller end of the trumpet, means for feeding said guide, and means for rocking said guide on its pivot, substantially as described.

2. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet and pivotal means for supporting its larger end, an adjustable socket attached to the smaller end of the trumpet, a stylus secured in said socket and adapted to rest upon the record and support the smaller end of the trumpet, a screw and means for rotating the same, a rod arranged parallel to said screw, a pivoted guide-carrier slidably mounted upon said rod and adapted to engage said screw, a fork carried by said guide-carrier and arranged to guide the smaller end of the trumpet, means for rocking said guide-carrier on its pivot to lift the smaller end of the trumpet and the stylus clear of the record, and means for holding the stylus out of contact with adjacent parts of the mechanism when the instrument is out of operation, substantially as described.

3. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet and pivotal means for supporting the larger end of the same, a stylus connected to the trumpet and adapted to rest upon the record and support the smaller end of the trumpet, a pivoted guide for the smaller end of the trumpet, means for feeding said guide, and means for rocking it on its pivot to lift the stylus from the record, substantially as described.

4. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet and pivotal means for supporting the larger end of the same, a stylus connected to the trumpet and adapted to rest upon the record and support the smaller end of the trumpet, a pivoted,



guide for the trumpet, means for feeding said guide-carrier, and means for rocking it upon its pivot to lift the stylus from the record, substantially as described.

5 5. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet, means for supporting the smaller end of the trumpet, and means for pivotally supporting the larger end of the trumpet, consisting of a vertical socket provided with vertical slots, a bent rod supported in said socket and provided with pins engaging said slots and also provided with a pointed extremity entering a hole in the side of the larger end of the trumpet, and a U-shaped piece over said hole within the larger end of the trumpet and arranged with a substantially horizontal longitudinal portion resting upon the point of the bent rod, substantially as described.

6. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet, and means for supporting its larger end, consisting of a vertical socket provided with slots, a bent rod supported in said socket and provided with pins engaging said slots, said rod being also provided with a pointed extremity entering a hole in the side of the larger end of the trumpet, and a U-shaped piece over said hole within the larger end of the trumpet and arranged with a substantially horizontal longitudinal portion resting upon the point of the rod, an adjustable socket attached to the smaller end of the trumpet, a stylus secured therein and adapted to rest upon the record and support the smaller end of the trumpet, a screw rotatably mounted parallel to the axis of the record, means for rotating the same, a

pivoted guide-carrier slidably mounted upon a rod and adapted to engage said screw, a fork carried by said guide-carrier and arranged to guide the smaller end of the trumpet, means for rocking said guide-carrier on its pivot to lift the smaller end of the trumpet and the stylus clear of the record, and means for holding the stylus out of contact with adjacent parts of the mechanism when the instrument is out of operation, substantially as described.

7. In a graphophone, the combination with the mandrel and record, of means for rotating the mandrel, a sound-trumpet, means for supporting the larger end thereof, consisting of a socket provided with slots, a rod supported in said socket and engaging the slots said rod being provided with a pointed extremity entering a hole in the side of the larger portion of the trumpet, and a U-shaped piece within the trumpet having an approximately horizontal longitudinal portion resting upon the point of the rod, a stylus connected to the trumpet adapted to rest upon the record and support the smaller end of the trumpet, a screw, means for rotating the same, a pivoted, slidably-mounted guide-carrier adapted to engage said screw and provided with a fork to guide the smaller end of the trumpet, and means for rocking said carrier on its pivot to lift the stylus from the record, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER C. RUNGE.

Witnesses:

HAROLD WADE,  
HARRY B. BRIDGE.





[Endorsed]: Acoustics. Class 181—Sub. 2. District Court of the United States in and for the Northern District of California, Second Division. In Equity. No. 15,623. Searchlight Horn Co. vs. Sherman, Clay & Co. [Stamped]: Return to Department of Patents. Defendant's Exhibit Runge Patent. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit Runge Patent. Filed Apr. 8, 1916. F. D. Monekton, Clerk.



C. McVEETY & J. F. FORD.  
SHIP'S VENTILATOR.

(Application filed July 10, 1901.)

(No Model.)

FIG. 1.

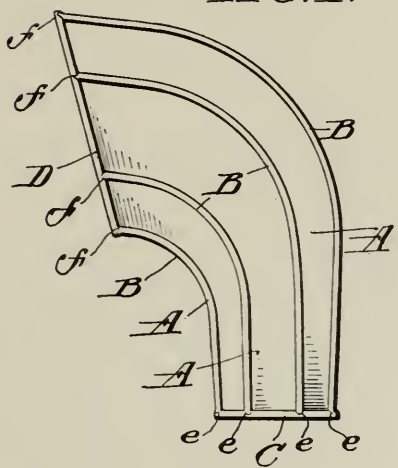


FIG. 4.

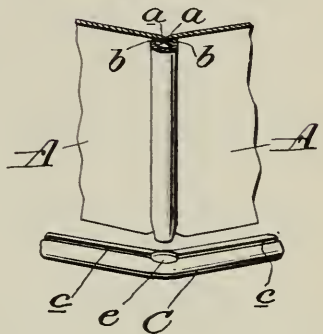


FIG. 2.

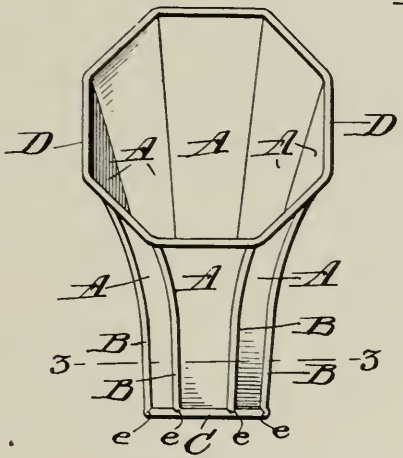
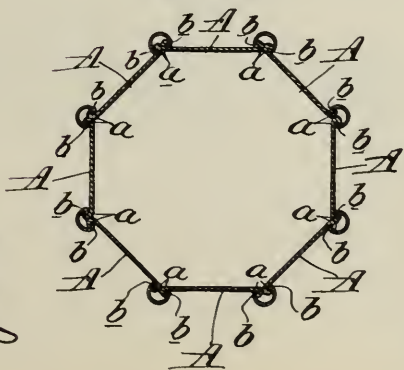


FIG. 3.



WITNESSES:

*Rowman S. Sterling*  
*Richard H. Sharp*

INVENTORS

*Charles McVeety*  
*John Ford*  
By their attorney  
*Walter W. Calhoun*



# UNITED STATES PATENT OFFICE.

CHARLES McVEETY AND JOHN F. FORD, OF PHILADELPHIA, PENNSYLVANIA.

## SHIP'S VENTILATOR.

SPECIFICATION forming part of Letters Patent No. 699,928, dated May 13, 1902.

Application filed July 10, 1901. Serial No. 67,714. (No model.)

*To all whom it may concern:*

Be it known that we, CHARLES McVEETY and JOHN F. FORD, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Ships' Ventilators, of which the following is a specification.

Referring to the accompanying drawings, forming part of this specification, Figure 1 illustrates a side elevation of a ventilator constructed in accordance with our invention. Fig. 2 represents a front elevation of the same. Fig. 3 shows a horizontal section on the line 3-3 of Fig. 2; and Fig. 4 represents a detached perspective view of a portion of the ventilator, showing the manner of uniting the parts.

The object of our invention is to construct a ventilator of that type known as "ships' ventilators" in the simplest and most economical manner, the plates of which the ventilator is made being stamped out in one operation, requiring no delicate bending and fitting, as is required in other types of ships' ventilators.

Referring to the reference-letters of the drawings, A represent the plates, which are of varying width and provided at the sides with upturned portions *a*, forming grooves for the reception of the ribs B, which are in the form of split tubes, the inward-projecting portions *b* being adapted to engage the grooves of the plates A.

In Figs. 1, 2, and 3 of the drawings we have shown the ventilator constructed of eight plates or sections forming an octagonal figure in cross-sections and at the base and mouth. It will be understood, however, that any num-

ber of plates, as A, may be employed without departing from the scope of our invention.

As shown in Fig. 4, the plates A at the base and mouth of the ventilator are covered with beadings C and D, having slots *c* and *d* to receive the plates A and openings *e* and *f* to receive the ribs B. The beadings C and D are firmly secured by brazing metal to the plates A and ribs B.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A ventilator comprising in combination with a series of curved plates of gradually-increasing width having upturned edges forming grooves, a series of split tubes or ribs for engaging the grooves of said plates, and ribs arranged at the base and mouth having grooves engaging the plates and openings to receive the ribs substantially as specified.

2. A ventilator comprising a curved tapered pipe octagonal in cross-section composed of plates A, having upturned end forming grooves, ribs B in the form of split tubes for engaging and holding said plates in position, and ribs C and D arranged respectively at the base and mouth of the ventilator having slotted openings to receive the plates and openings for the ribs, substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES McVEETY.  
JOHN F. FORD.

Witnesses:

C. P. S. GARWOOD,  
H. E. COUGHLIN.





[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cal. Dfts. Exhibit "N." Oct. 2, '12. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "N." Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "N." Filed Apr. 8, 1916. F. D. Monckton, Clerk.



No. 739,954.

PATENTED SEPT. 29, 1903..

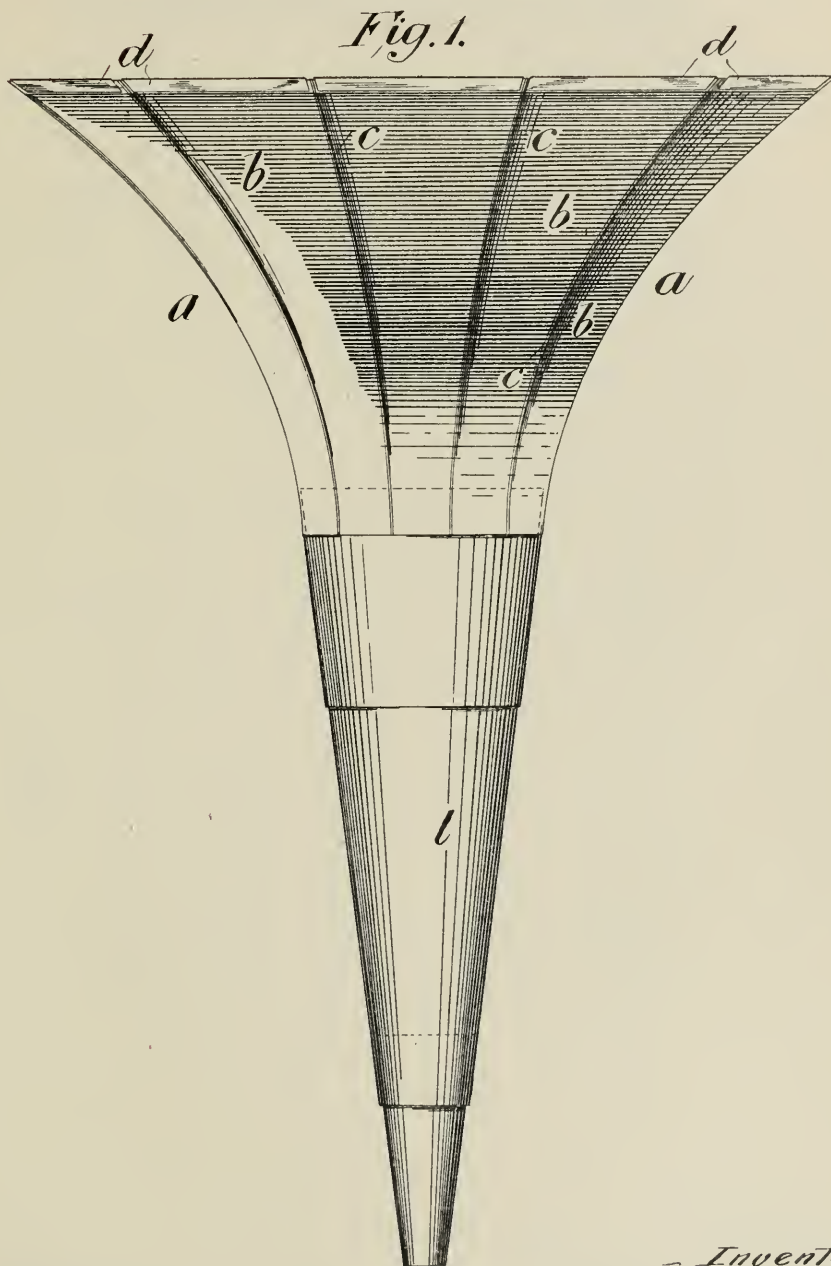
G. H. VILLY.

HORN FOR PHONOGRAPHS, EAR TRUMPETS, &c.

APPLICATION FILED DEC. 8, 1902.

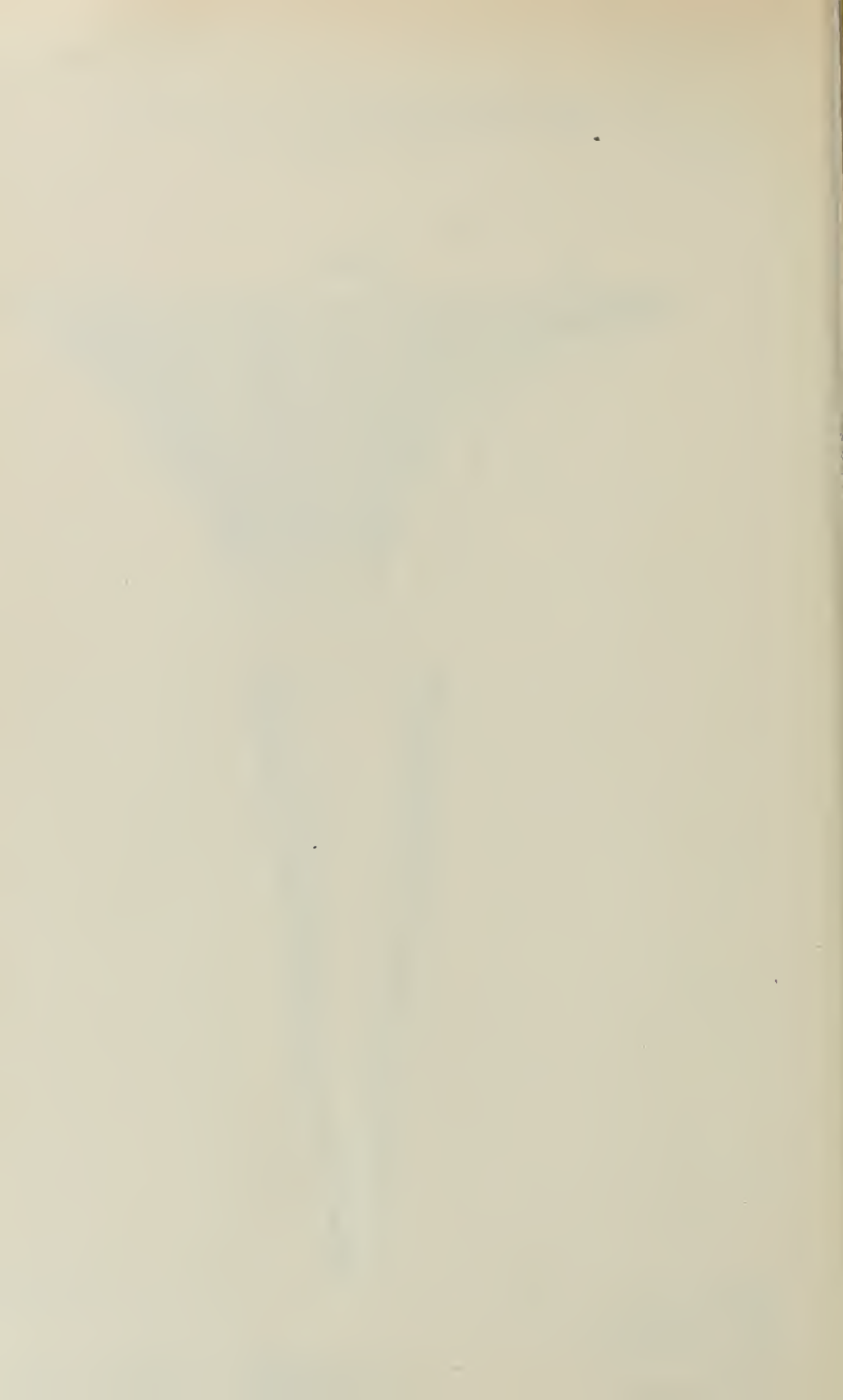
NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:  
*L. Hilton*  
*A. Veazie*

- Inventor -  
*Gustave H. Villy -*  
 By *H. Blaisson & Co*  
 Attorneys -





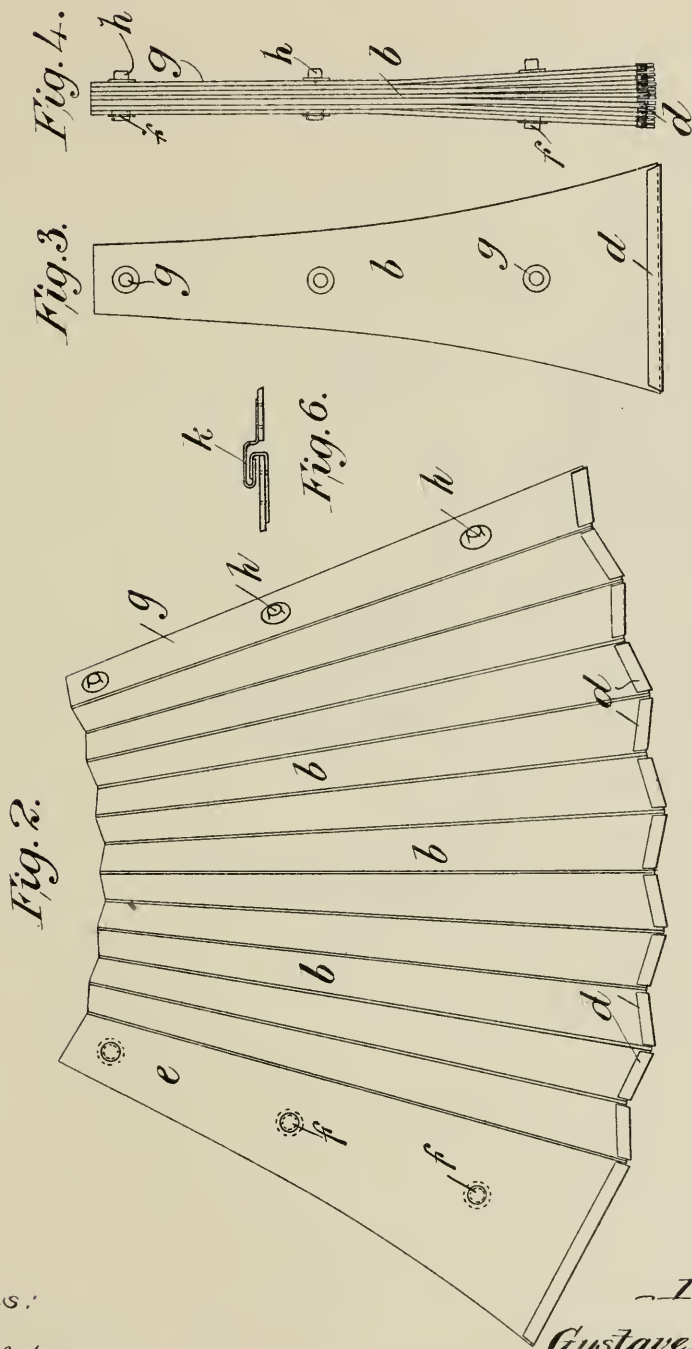
G. H. VILLY.

HORN FOR PHONOGRAPHS, EAR TRUMPETS, &c.

APPLICATION FILED DEC. 8, 1902.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses:

L. Hilton  
A. Veazie

Inventor

Gustave H. Villy

By H. B. Villison & Co.

Attorneys



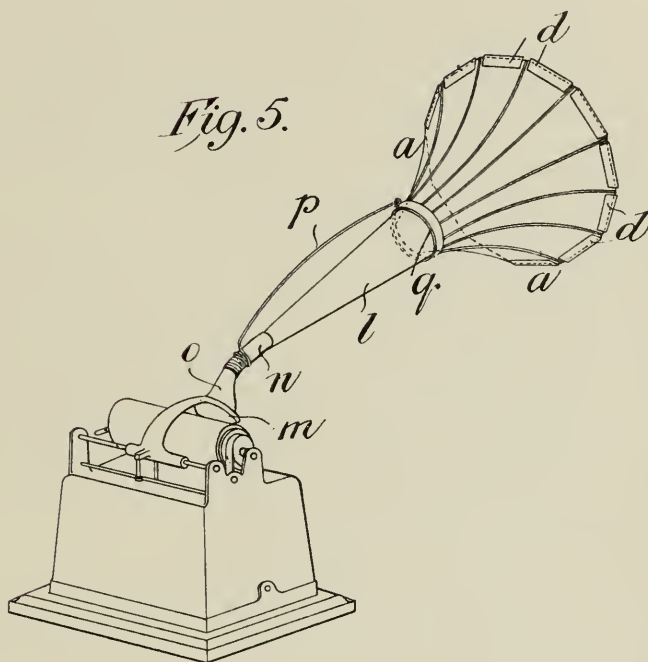
No. 739,954.

PATENTED SEPT. 29, 1903.

G. H. VILLY.  
HORN FOR PHONOGRAPHS, EAR TRUMPETS, &c.  
APPLICATION FILED DEC. 8, 1902.

NO MODEL.

3 SHEETS—SHEET 3.



Witnesses  
*L. Hilton*  
*A. Veazie*

Inventor—  
*Gustave H. Villy*—  
By *H. B. Willson & Co*  
Attorneys



# UNITED STATES PATENT OFFICE.

GUSTAVE HARMAN VILLY, OF MANCHESTER, ENGLAND.

## HORN FOR PHONOGRAPHS, EAR-TRUMPETS, &c.

SPECIFICATION forming part of Letters Patent No. 739,954, dated September 29, 1903.

Application filed December 8, 1902. Serial No. 134,413. (No model.)

### *To all whom it may concern:*

Be it known that I, GUSTAVE HARMAN VILLY, a subject of the King of Great Britain and Ireland, residing at 5 Longford Place, Longsight, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Connection with Horns for Phonographs, Ear Instruments, and for Like Purposes, (for which I have made application for Letters Patent in Great Britain, No. 20,146, and dated 15th day of September, 1902,) of which the following is a specification.

This invention relates to improvements in connection with horns or trumpet-like sound distributors or collectors for use upon phonographs, gramophones, and other like instruments and also for ear-trumpets, fog-horns, and other sound distributing and collecting devices, the object being to provide a horn or trumpet-like device which can be folded when not in use, so as to be capable of ready transportation and for placing within the case of the phonograph or in the pocket of the user when it is to be applied to an ear instrument or the like.

The accompanying drawings represent one form of the invention.

Figure 1 is an elevation of the complete or erected horn. Figs. 2, 3, and 4 are detail views illustrating the manner in which the horn can be collapsed or folded. Fig. 5 is a perspective view illustrating one convenient application of the improved horn to a phonograph. Fig. 6 is a detail view on an enlarged scale.

In carrying my invention into effect in one convenient manner when making my folding horn for use, particularly in connection with a phonograph or like instrument, I make the end *a* of trumpet-like or curved configuration with an enlarged outer end and a smaller end at the interior of the conoidal-like form. I make this enlarged and trumpet-like device by employing a series of strips *b*, of paper, wood, linen, or other preferably flexible material, the foundations of which I prefer to make of linen or the like, so as to form a hinge-like connection *c* between each of the strips, the members *b* of which I arrange so that while lying close together when extended

there is a dividing-line between them about which they can be folded upon the base of linen or the like connecting-web upon which the paper or other material is mounted. The longitudinal hinged edges *c* of the flexible segments or sectors *b* are curved in such manner that although the segments when opened out cannot lie in the same plane they can either be folded together in a zigzag manner, so as to lie parallel to one another, as shown in Figs. 2 to 4, or extended by springing or buckling into the requisite trumpet or bell-like form, as shown in Figs. 1 and 5. The angles formed by the meeting of the hinged segments when extended form, as it were, ribs, giving rigidity to the trumpet form. The outer ends of the segmental-like strips I prefer to protect by a bent or turned-over edging *d* of metal, making the connection rigid by pressing a portion of the strip of metal or other binding material into the edge of the paper or the like foundation.

Upon the extreme member *e* of the series of strips *b* thus formed into one band I provide eyelets for other clip-like devices for enabling snap projections *h* on the opposite end strip *g* to be engaged therewith and when thus engaged to form a completed trumpet-like sound-distributor.

Instead of arranging eyelets or hook-like clips upon the outer members of the series of strips I may make one to engage with the other by forming a bead-like connection or flange *k* upon one member, into which the corresponding projecting or engaging portions of the other may enter, as shown in Fig. 6. When providing for an extension and a long funnel-like carrier for the built-up trumpet-like end *a* to engage with, I sometimes make a conical tube *l*, the enlarged end of which engages with the inner end of the trumpet-terminal *a*, while the smaller end of the cone engages with the receiver *m* of the phonograph or enters into the rubber or other tubular or flexible connection which may be employed for use upon any particular instrument. I prefer to make this extended or carrying member *l* for the collapsible trumpet from paper or other suitable material built up in a similar manner to that hereinbefore described to my collapsible end, or the



cone may be made in a short length in one piece, or it may be made telescopic when so desired.

When providing for a flexible connection at the extreme end of the cone *l*, I attach a length of rubber or the like tubing *n*, which I bind with metal or other band at the end for the purpose of inserting it upon the funnel *o* of the phonograph-reproducer, and I stiffen the combination trumpet and funnel with flexible end by providing one or more bars *p* of metal or the like stiffeners which support the funnel by means of elastic or other connections *q*, arranged upon the cone end and suspended from the projecting stiffening hook or members *p*, carried from the metal end or binder of the flexible tube *n*.

When constructing a funnel or tube for an ear-trumpet or for a fog or speaking horn or the like, I employ the same method of building up the segments to form the expanding-surface, modifying the arrangement of the inner end to suit the connection that is to be made therewith, so that when the trumpet is in use it can be extended and a large outer area exposed for the collection of sound and when not in use it can be folded, each segment upon the other, so as to occupy but little space—that is to say, a trumpet such as illustrated in Figs. 1 to 4 would be suitable as an ear-trumpet.

I am aware that it has hitherto been proposed to form conical or pyramidal horns from cardboard provided with a linen foundation; but such horns have been made up from a single flat scored sheet or from a number of flat triangular strips having straight edges. Such horns could be developed or laid out upon a flat surface. Owing to their formation if such horns were made collapsible they would have to be sustained in their conical form by additional sustaining means, or if they were made self-sustaining they could not be made collapsible. In contradistinction to this my collapsible horn could not be made up from a single flat sheet, as each strip has to be made with curved edges, and when the strips are flexibly secured together at such curved edges the whole or complete surface so formed cannot be laid out or developed on a flat surface. My horn, owing to the curvature of the edges of the strips, is self-sustaining and requires no additional stiffening or sustaining devices, although when it is desired to collapse the horn this may be effected by forcibly straightening and folding the strips one against the other in the manner hereinbefore described with reference to Figs. 2, 3, and 4. The horn when erected offers a decided resistance to such straightening or folding sufficient to render it self-sustaining against all ordinary shocks liable to be encountered; but it is found that when one strip has been forcibly straightened or folded

against another the equilibrium of the trumpet is destroyed and the whole may be easily collapsed.

I do not limit the application of my invention to any particular method of building up the segments or to any special curve or configuration of the same, and I vary the method of jointing and stiffening them to suit the material from which the strips are constructed and the foundation or base fabric upon which the flexible material forming the strips is secured.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprised of a number of flexible strips having curved meeting edges substantially as set forth.

2. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprising a number of flexible strips having curved meeting edges and mounted on a flexible foundation, substantially as and for the purposes hereinbefore set forth.

3. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprising a number of flexible strips having curved meeting edges, a flexible foundation for said strips and means for detachably securing the two extreme strips together, substantially as set forth.

4. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprising a number of flexible strips having curved meeting edges, flexible connections between such edges and protecting means on the outer exposed edges, substantially as set forth.

5. A phonograph-horn, ear-trumpet or the like comprising a rigid conical tube and a collapsible trumpet-shaped mouth the latter being made up of a number of flexible strips having curved meeting edges, and flexible connections at such edges, substantially as hereinbefore set forth.

6. A horn of the class described comprising a rigid conical tube, and a collapsible trumpet-shaped mouth made up of a number of flexible strips having curved meeting edges, said mouth being connected to said rigid conical tube, substantially as described.

7. A horn of the class described comprising a rigid conical tube, and a collapsible trumpet-shaped mouth made up of a number of flexible strips having curved meeting edges, said mouth being telescopically connected to said conical tube, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

GUSTAVE HARMAN VILLY.

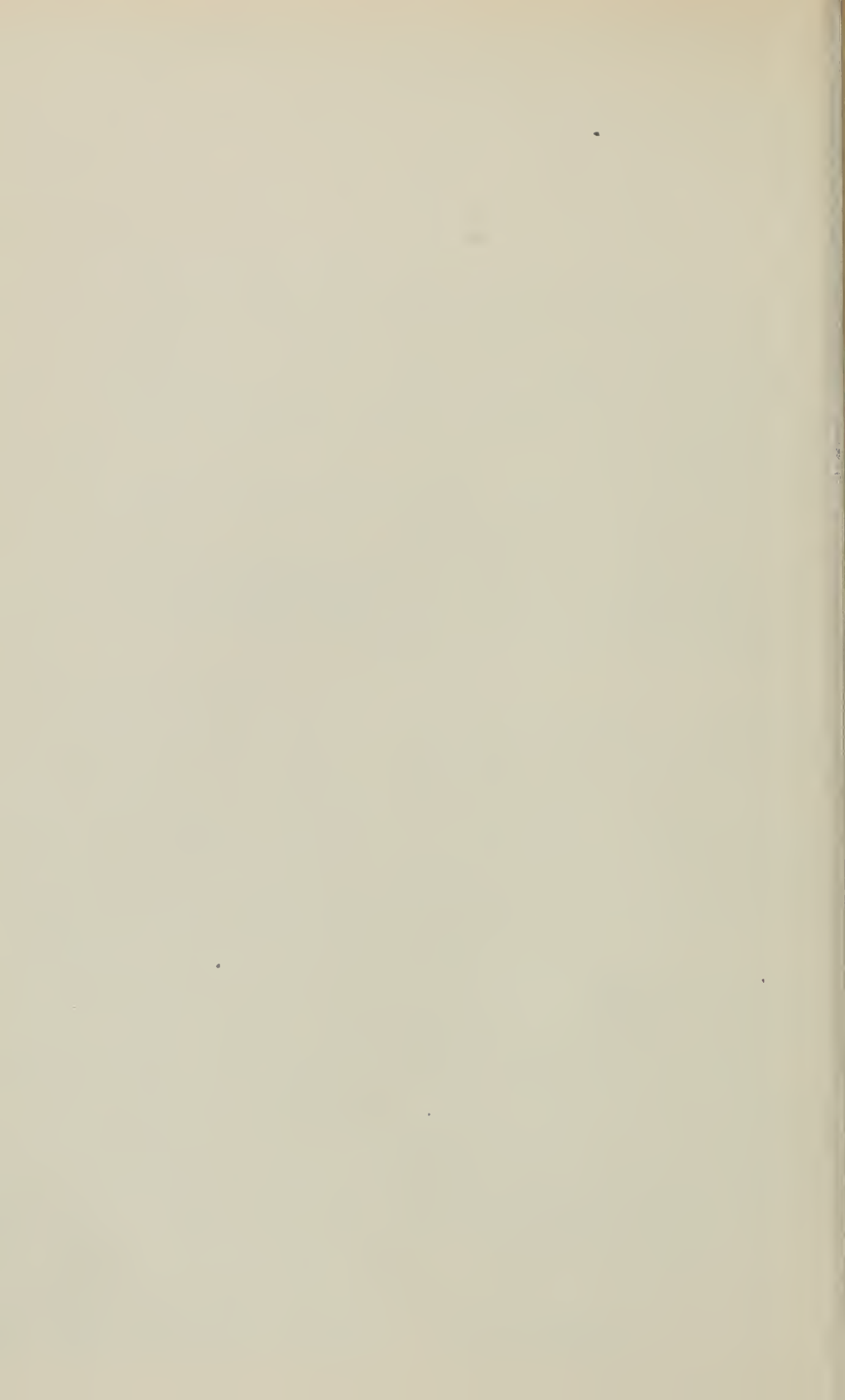
Witnesses:

DORA VILLY,  
V. A. B. HUGHES.

[Endorsed]: District Court of the United States in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co., vs. Sherman, Clay & Co. Defendant's Exhibit Villey Patent, of 1903. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit Villey Patent. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



E. A. SCHOETTEL.  
PROCESS OF MANUFACTURING HORNS.

APPLICATION FILED FEB. 18, 1904.

NO MODEL.

Fig. 1.

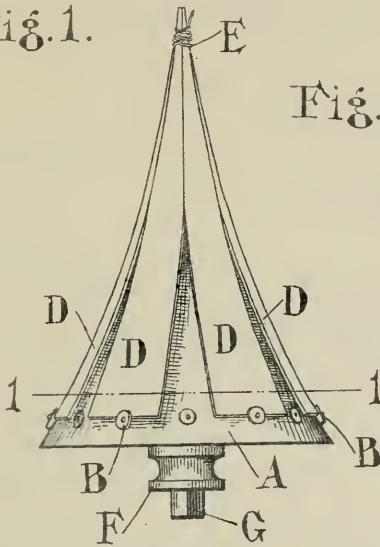


Fig. 3.

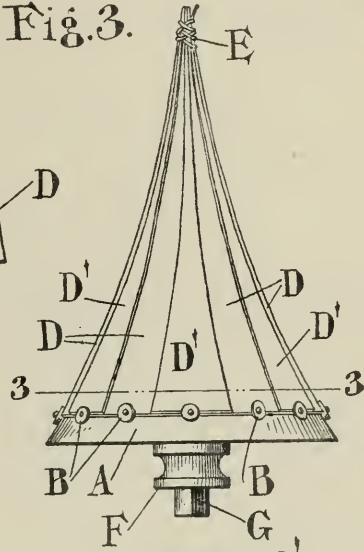


Fig. 5.



Fig. 2.

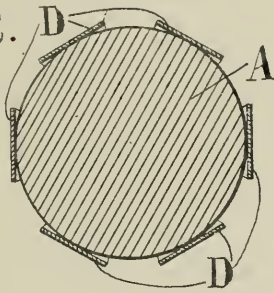


Fig. 4.

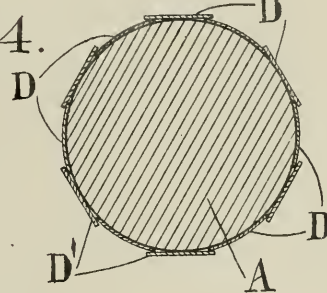
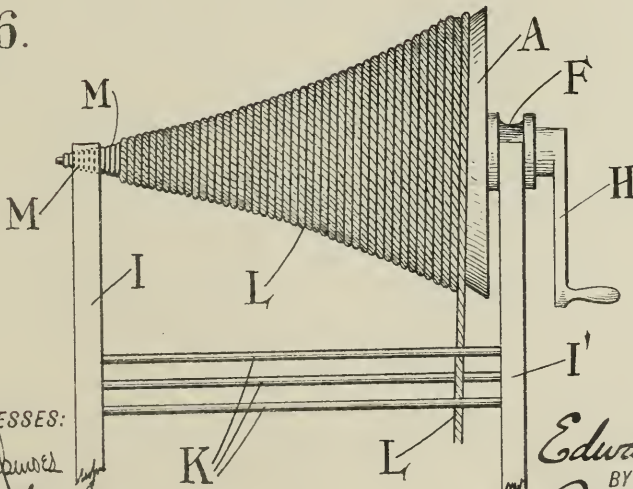


Fig. 6.



WITNESSES:

*Lindley Schaffner*  
*F. M. Donbach*

INVENTOR

*Edward A. Schoettel*  
BY  
*Phillips Abbott*  
ATTORNEY





# UNITED STATES PATENT OFFICE.

EDWARD A. SCHOETTEL, OF BROOKLYN, NEW YORK, ASSIGNOR TO  
EMMA J. SCHOETTEL, OF BROOKLYN, NEW YORK.

## PROCESS OF MANUFACTURING HORNS.

SPECIFICATION forming part of Letters Patent No. 769,410, dated September 6, 1904.

Application filed February 18, 1904. Serial No. 194,161. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD A. SCHOETTEL, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented a new and useful Process or Method for the Manufacture of Megaphone and Similar Horns, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 illustrates an elevation of the former or block on which the horn is made, showing some of the pieces or gores of paper or similar material in position thereon which, with others, are to form the horn. Fig. 2 illustrates an end view of that which is shown in Fig. 1 on the line 1 1 of that view. Fig. 3 illustrates an elevation similar to that shown in Fig. 1, showing, however, all of the pieces or gores also of material which, with the others shown, are to form the horn, in place on the former, covering the spaces between the longer gores. Fig. 4 illustrates an end view of that which is shown in Fig. 3, taken on the line 3 3 of that figure. Fig. 5 illustrates a detail showing the notch in the lower end of the gores, whereby they are held in position on the former. Fig. 6 illustrates an elevation of the apparatus whereby the gores are all drawn forcibly down to position and held there until dried.

A represents the conical or tapering former or block upon which the horn is made up from a series of tapered or gore-shaped pieces D D' D' of paper or similar material. The former may be and usually is made of wood, although any other suitable material may be used. Its exterior shape determines the shape of the horn.

B B are a series of catches, which may be like very large headed nails, driven into or fastened to the former at stated intervals near its larger end, as shown, in such positions that a notch C (see Fig. 5) made in the lower edge of each of the gores will fit under the appropriate nail, and thereby that end of the gore will be held against lateral movement during the process of applying them upon the former.

The upper ends of the gores (see Figs. 1

and 2) are confined partly by glue or other adhesive material applied to them where they overlap and also by a cord E, which is tightly tied about their upper ends, where they are applied to the former.

F is a round bearing, preferably grooved, as shown, fastened centrally on the base of the former, and outside of the journal part is a squared projecting part G, adapted to receive a crank H. (See Fig. 6.)

I and I' are two vertical bars constituting a frame, which is suitably braced and provided with suitable tension devices, such as the cross-bars K K. At the upper end of the bar I there is an open-ended semicircular notch or journal, adapted to receive the small end of the former with the tied ends of the gores thereon, and on the upper end of the other bar, I', there is another, open-ended journal, adapted to receive the bearing F.

L is a small rope, which may be about the size of an ordinary clothes-line or somewhat larger, if preferred, and it is of such length as to make successive coils, preferably touching each other, the whole length of the gores and preferably one or two additional coils. I prefer that at the smaller end of the horn a few feet of material, such as pigskin or belt lacing M, be substituted for the rope, but attached to it, because such material, being more pliant and self-adjusting than the rope, will more satisfactorily draw the small and relatively stiff edges of the narrower part of the gores into position than the rope will, and also some part of the pigskin lacing necessarily, or at least preferably, rests within the journal, being wound tightly thereon under the strain of the crank in such manner that the former revolves on it, and I have found that the pressure of this operation on the pliant lacing secures a better finish to the small end of the horn than if the rope were used and also that the lacing will not wear or fray out as much as the rope will.

The operation is as follows: After the gores have been applied to the former in the manner stated the former is lifted from its primary support and placed in the winding-frame. (Shown in Fig. 6.) Then the crank is applied

the squared boss G, and the end of the lacing M is firmly attached to the small end of the former, preferably just at the ends of the gores or slightly beyond them. Then one operative forcibly turns the crank which further directs and applies tension upon the rope and lacing. In this way the strain may be uniform or varied, as circumstances require and as observed, during the winding operation to draw all the edges of the several gores from their angular position (shown in Figs. 2 and 4) into the requisite circular form to make a handsomely-finished and uniformly-shaped product. If the glue or other adhesive material has at all set or chilled before the forming pressure is applied to the gores, then I subject the same to a blast of steam, which will soften the adhesive material and render all parts pliant, so that they will readily respond to the pressure exerted by the lacing and rope, or by the rope alone if the lacing is not used.

Obviously lacing may be used throughout, if preferred, and any equivalent material other than the rope or lacing may be substituted therefor.

After the compression or forming of the gores has been finished by winding the rope or its equivalent on them, as shown, then the end of the rope is suitably fastened and the whole set aside to dry in its then condition. Meantime other horns may be made on other formers. When dry, the rope and lacing are unwound and removed, and then the edges of the gores are sandpapered down and the horn is finished in the usual way.

It will be obvious to those who are familiar with this art that many modifications may be made in the details of construction and operation of the parts. The former may be turned by machinery, and the flexible rope binder may be manipulated in a variety of ways, all, however, within the spirit and embodying the essentials of my process, which consists in the application upon the gores of the horn while they are held in position and while the adhesive material is yet soft of the pressure of a flexible binding device adapted to apply equal or varying pressures, as desired, upon each and every part of the gores, irrespective of the shape and size of the horn and of the material of which it is composed.

I claim—

1. The process described in the manufacture of horns, consisting in cutting the material of which the horn is to be made into gore-shaped pieces, detachably attaching said pieces to an interior former, whereby circumferential movement of one relative to the other is prevented, the edges of said pieces overlapping, applying adhesive material between the overlapping edges, revolving the interior former and the pieces with it while the adhesive material is still soft and subjecting the parts composing the horn to the continuous

and forcible pressure of a single flexible and elastic binding device which is wound upon them under tension as the former revolves.

2. The process described in the manufacture of horns, consisting in cutting the material of which the horn is to be made into gore-shaped pieces, detachably attaching said pieces to an interior former, whereby circumferential movement of one relative to the other is prevented, the edges of said pieces overlapping, applying adhesive material between the overlapping edges, revolving the interior former and the pieces with it while the adhesive material is still soft and subjecting the parts composing the horn to the continuous and forcible pressure of a single flexible and elastic binding device, which is wound upon them under tension as the former revolves, the winding of the binding device upon the gore-shaped pieces commencing at the small end of the horn and progressing toward the larger end thereof.

3. The process described in the manufacture of horns, consisting in cutting the material of which the horn is to be made into gore-shaped pieces, detachably attaching said pieces to an interior former, whereby circumferential movement of one relative to the other is prevented, the edges of said pieces overlapping, applying adhesive material between the overlapping edges and winding under tension continuously applied always in the same direction upon the parts composing the body of the horn, while they are supported in position upon the former, a flexible and elastic binding device, which is wound upon the said pieces commencing at the small end and extending toward the larger end, said binding device being provided with means whereby its tension may be varied at will.

4. The process described in the manufacture of horns, consisting in cutting the material of which the horn is to be made into gore-shaped pieces, detachably attaching said pieces to an interior former, whereby circumferential movement of one relative to the other is prevented, the edges of said pieces overlapping, softening adhesive material previously applied between the overlapping edges by the application of steam thereto, revolving the interior former and the pieces with it while the adhesive material is plastic and adhesive and subjecting the parts composing the horn to the continuous and forcible pressure of a single flexible and elastic binding device which is wound upon them under tension as the former revolves.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD A. SCHOETTEL.

Witnesses:

FLORA M. DONSBACH,  
ALFRED G. SCHOETTEL.

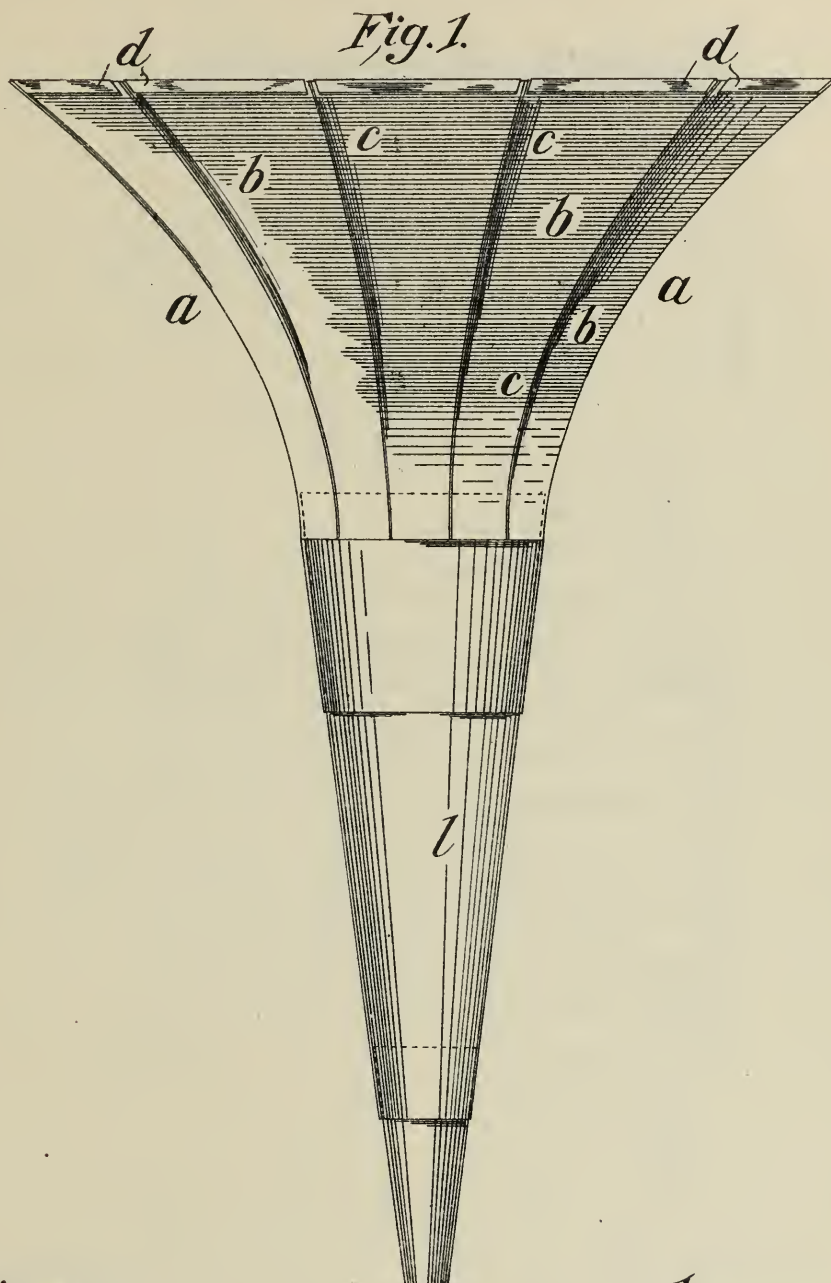


G. H. VILLY.

HORN FOR PHONOGRAPHS, EAR TRUMPETS, &amp;c.

APPLICATION FILED OCT. 26, 1905.

3 SHEETS—SHEET 1.



Witnesses

C. Andrews

J. B. Additt

Inventor

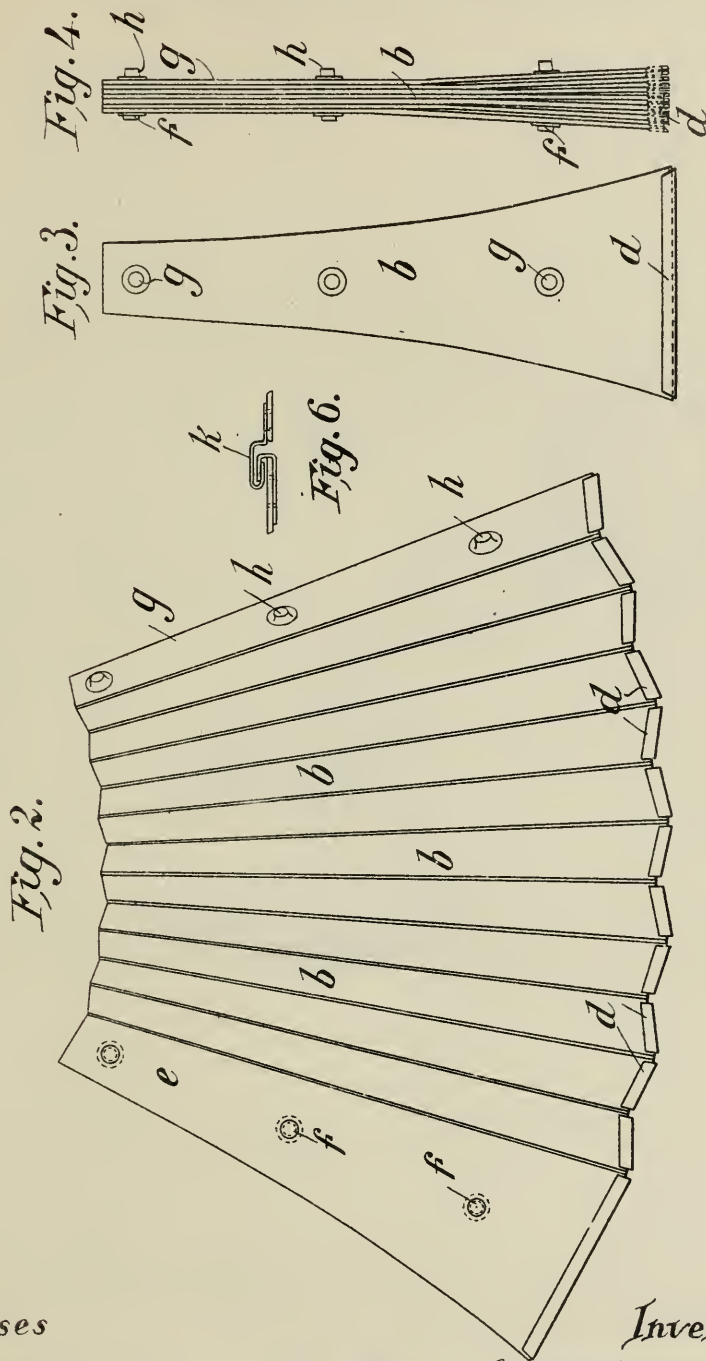
By His Gustave Harman Villy

Attorney J. B. Stickney



G. H. VILLY.  
HORN FOR PHONOGRAPHS, EAR TRUMPETS, &c.  
APPLICATION FILED OCT. 26, 1905.

3 SHEETS—SHEET 2.



Witnesses

C. H. Andrews

J. Bassett

Inventor

By His Gustave Harman Villy  
Attorney B. C. Stickney



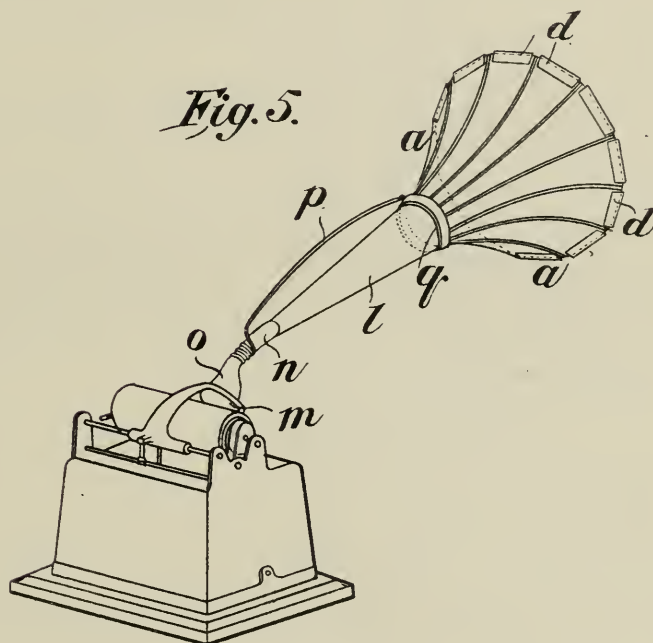


G. H. VILLY.

HORN FOR PHONOGRAPHS, EAR TRUMPETS, &c.

APPLICATION FILED OCT. 26, 1905.

3 SHEETS—SHEET 3.



*Witnesses*

*E. H. Andrews*

*J. B. Addett*

*Inventor*

*By His Gustave Harmon Villy*  
*Attorney B. B. Stetney*



HORN FOR PHONOGRAPHS, EAR-TRUMPETS, &c.

No. 12,442.

Specification of Reissued Letters Patent.

Reissued Jan. 30, 1906.

Original No. 739,954, dated September 29, 1903. Application for reissue filed October 26, 1905. Serial No. 284,581.

*To all whom it may concern:*

Be it known that I, GUSTAVE HARMAN VILLY, a subject of the King of Great Britain and Ireland, residing at 5 Longford Place, Longsight, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Connection with Horns for Phonographs, Ear Instruments, and for Like Purposes, (for which I have made application for Letters Patent in Great Britain, No. 20,146, and dated 15th day of September, 1902,) of which the following is a specification.

This invention relates to improvements in connection with horns or trumpet-like sound distributors or collectors for use upon phonographs, gramophones, and other like instruments, and also for ear-trumpets, fog-horns, and other sound distributing and collecting devices, the object being to provide a horn or trumpet-like device which can be folded when not in use, so as to be capable of ready transportation and for placing within the case of the phonograph or in the pocket of the user when it is to be applied to an ear instrument or the like.

The accompanying drawings represent one form of the invention.

Figure 1 is an elevation of the complete or erected horn. Figs. 2, 3, and 4 are detail views illustrating the manner in which the horn can be collapsed or folded. Fig. 5 is a perspective view illustrating one convenient application of the improved horn to a phonograph. Fig. 6 is a detail view on an enlarged scale.

In carrying my invention into effect in one convenient manner when making my folding horn for use, particularly in connection with a phonograph or like instrument, I make the end *a* of trumpet-like or curved configuration with an enlarged outer end and a smaller end at the interior of the conoidal-like form. I make this enlarged and trumpet-like device by employing a series of strips *b* of paper, wood, linen, or other preferably flexible material, the foundations of which I prefer to make of linen or the like, so as to form a hinge-like connection *c* between each of the strips, the members *b* of which I arrange so that while lying close together when extended there is a dividing-line between them, about which they can be folded upon the base of

linen or the like connecting-web, upon which the paper or other material is mounted. The longitudinal hinged edges *c* of the flexible segments or sectors *b* are curved in such manner that although the segments when opened out cannot lie in the same plane they can either be folded together in a zigzag manner, so as to lie parallel to one another, as shown in Figs. 2 to 4, or extended by springing or buckling into the requisite trumpet or bell-like form, as shown in Figs. 1 and 5. The angles formed by the meeting of the hinged segments when extended form, as it were, ribs, giving rigidity to the trumpet form. The outer ends of the segmental-like strips I prefer to protect by a bent or turned-over edging *d* of metal, making the connection rigid by pressing a portion of the strip of metal or other binding material into the edge of the paper or the like foundation.

Upon the extreme member *e* of the series of strips *b* thus formed into one band I provide eyelets *f* or other clip-like devices for enabling snap projections *h* on the opposite end strip *g* to be engaged therewith and when thus engaged to form a completed trumpet-like sound-distributor.

Instead of arranging eyelets or hook-like clips upon the outer members of the series of strips I may make one to engage with the other by forming a bead-like connection or flange *k* upon one member, into which the corresponding projecting or engaging portions of the other may enter, as shown in Fig. 6. When providing for an extension and a long funnel-like carrier for the built-up trumpet-like end *a* to engage with, I sometimes make a conical tube *l*, the enlarged end of which engages with the inner end of the trumpet-terminal *a*, while the smaller end of the cone engages with the receiver *m* of the phonograph or enters into the rubber or other tubular or flexible connection which may be employed for use upon any particular instrument. I prefer to make this extended or carrying member *l* for the collapsible trumpet from paper or other suitable material built up in a similar manner to that hereinbefore described to my collapsible end, or the cone may be made in a short length in one piece or it may be made telescopic when so desired.

When providing for a flexible connection at the extreme end of the cone *l*, I attach a



length of rubber or the like tubing *n*, which I bind with metal or other band at the end for the purpose of inserting it upon the funnel *o* of the phonograph-reproducer, and I stiffen the combination trumpet and funnel with flexible end by providing one or more bars *p* of metal or the like stiffeners which support the funnel by means of elastic or other connections *q*, arranged upon the conic end and suspended from the projecting stiffening hook or members *p*, carried from the metal end or binder of the flexible tube *n*.

When constructing a funnel or tube for an ear-trumpet or for a fog or speaking horn or the like, I employ the same method of building up the segments to form the expanding surface, modifying the arrangement of the inner end to suit the connection that is to be made therewith, so that when the trumpet is in use it can be extended and a large outer area exposed for the collection of sound and when not in use it can be folded each segment upon the other, so as to occupy but little space—that is to say, a trumpet such as illustrated in Figs. 1 to 4 would be suitable as an ear-trumpet.

I am aware that it has hitherto been proposed to form conical or pyramidal horns from cardboard provided with a linen foundation; but such horns have been made up from a single flat scored sheet or from a number of flat triangular strips having straight edges. Such horns could be developed or laid out upon a flat surface. Owing to their formation, if such horns were made collapsible they would have to be sustained in their conical form by additional sustaining means, or if they were made self-sustaining they could not be made collapsible. In contradistinction to this my collapsible horn could not be made up from a single flat sheet, as each strip has to be made with curved edges, and when the strips are flexibly secured together at such curved edges the whole or complete surface so formed cannot be laid out or developed on a flat surface. My horn, owing to the curvature of the edges of the strips, is self-sustaining and requires no additional stiffening or sustaining devices, although when it is desired to collapse the horn this may be effected by forcibly straightening and folding the strips one against the other in the manner hereinbefore described with reference to Figs. 2, 3, and 4. The horn when erected offers a decided resistance to such straightening or folding sufficient to render it self-sustaining against all ordinary shocks liable to be encountered; but it is found that when one strip has been forcibly straightened or folded against another the equilibrium of the trumpet is destroyed and the whole may be easily collapsed.

I do not limit the application of my invention to any particular method of building up the segments or to any special curve or con-

figuration of the same, and I vary the method of jointing and stiffening them to suit the material from which the strips are constructed and the foundation or base fabric upon which the flexible material forming the strips is secured.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprising a number of flexible strips having curved meeting edges substantially as set forth.

2. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprising a number of flexible strips having curved meeting edges and mounted on a flexible foundation, substantially as and for the purposes hereinbefore set forth.

3. A collapsible but self-sustained phonograph-horn ear-trumpet or the like comprising a number of flexible strips having curved meeting edges, a flexible foundation for said strips and means for detachably securing the two extreme strips together, substantially as set forth.

4. A collapsible but self-sustained phonograph-horn, ear-trumpet or the like comprising a number of flexible strips having curved meeting edges, flexible connections between such edges and protecting means on the outer exposed edges, substantially as set forth.

5. A phonograph-horn, ear-trumpet or the like comprising a rigid conical tube and a collapsible trumpet-shaped mouth, the latter being made up of a number of flexible strips having curved meeting edges, and flexible connections at such edges, substantially as hereinbefore set forth.

6. A horn of the class described comprising a rigid conical tube, and a collapsible trumpet-shaped mouth made up of a number of flexible strips having curved meeting edges, said mouth being connected to said rigid conical tube, substantially as described.

7. A horn of the class described comprising a rigid conical tube, and a collapsible trumpet-shaped mouth made up of a number of flexible strips having curved meeting edges, said mouth being telescopically connected to said conical tube, substantially as described.

8. A phonograph-horn or the like comprising a number of flexed strips having curved meeting edges, and means joining said edges, said strips being so flexed and said edges so curved and joined that the horn is given a trumpet-like or bell-like form, the strips forming angles where said edges meet.

9. A phonograph-horn or the like comprising a number of strips each having a foundation or facing of linen or the like, said strips being so flexed and their edges so curved and joined that the horn is given a trumpet-like



or bell-like form, the strips forming angles where said edges join or meet.

10. A phonograph-horn comprising a number of strips joined or meeting at their edges, said strips being so flexed and said edges so curved that the horn is given a trumpet-like or bell-like form, the strips forming angles where said edges join, and protecting means on the outer exposed edges or ends of the strips.

11. A horn comprising a funnel-like portion and a trumpet-shaped mouth portion, the latter comprising a number of strips provided with means joining them at their edges, said strips being flexed and said edges curved so as to produce the trumpet form of said mouth portion, and said strips having angular relation to one another, substantially as described.

12. A phonograph-horn comprising a number of flexed strips having curved meeting edges, means joining said strips edge to edge, said strips being so flexed and said edges so curved and joined that the horn is given a trumpet-like or bell-like form, the strips forming angles where said edges meet, and

protecting devices applied upon the outer exposed edges or ends of the strips.

13. A phonograph-horn comprising a funnel-like portion and a mouth portion, the latter comprising a number of side portions extending lengthwise of the horn and joining one another at their borders, forming angles where joining, said sides so curved at their corner portions and so flexed as to give the mouth portion a trumpet-like or bell-like form, and their outer exposed ends being provided with protecting means.

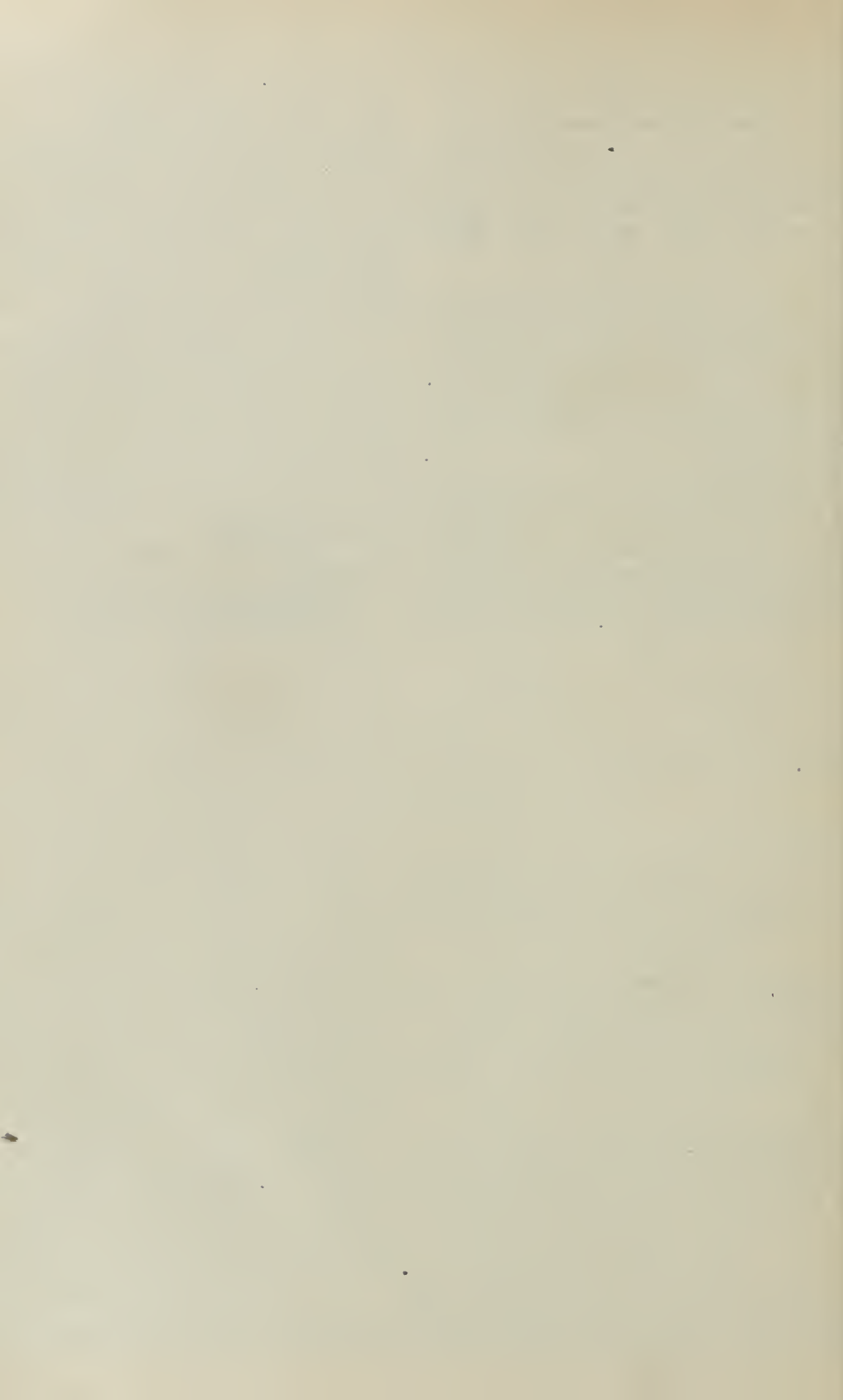
14. A horn comprising a funnel-like portion and a trumpet-shaped mouth portion, the latter comprising a number of strips or sides provided with means joining them at their edges, said strips being flexed and said edges curved so as to produce the trumpet form of said mouth portion, and said strips having angular relation to one another, and protecting means on the outer exposed edges or ends of the strips.

GUSTAVE HARMAN VILLY.

Witnesses:

DORA VILLY,

ROBERT MORRISON NEILSON.



[Endorsed]: District Court of the United States in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co. vs. Sherman, Clay & Co. Defendant's Exhibit Villy Reissue Patent. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit Villy Reissue Patent. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



No. 648,994.

Patented May 8, 1900.

M. D. PORTER.  
COLLAPSIBLE ACOUSTIC HORN.

(Application filed July 31, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1

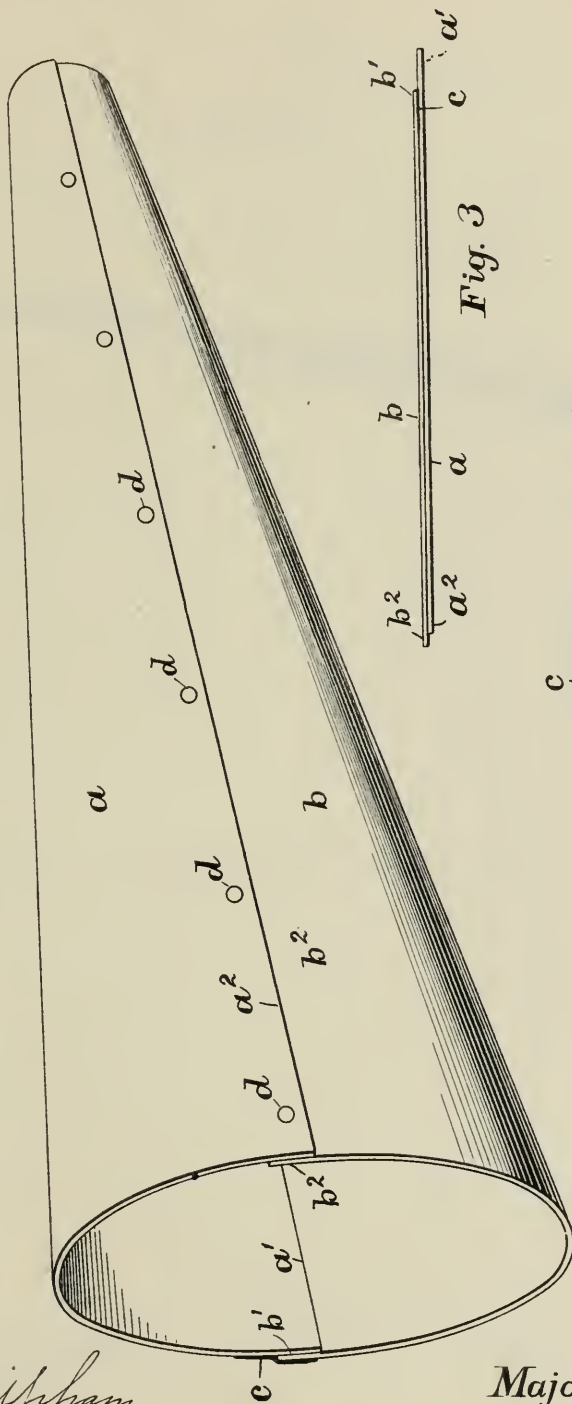


Fig. 3

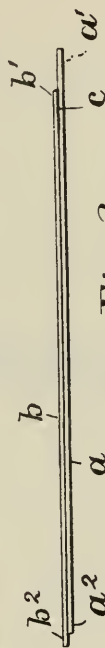
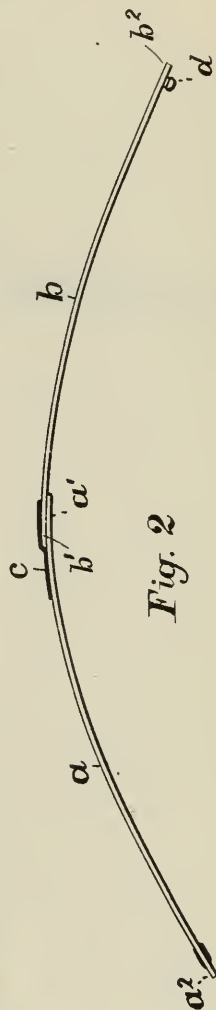


Fig. 2



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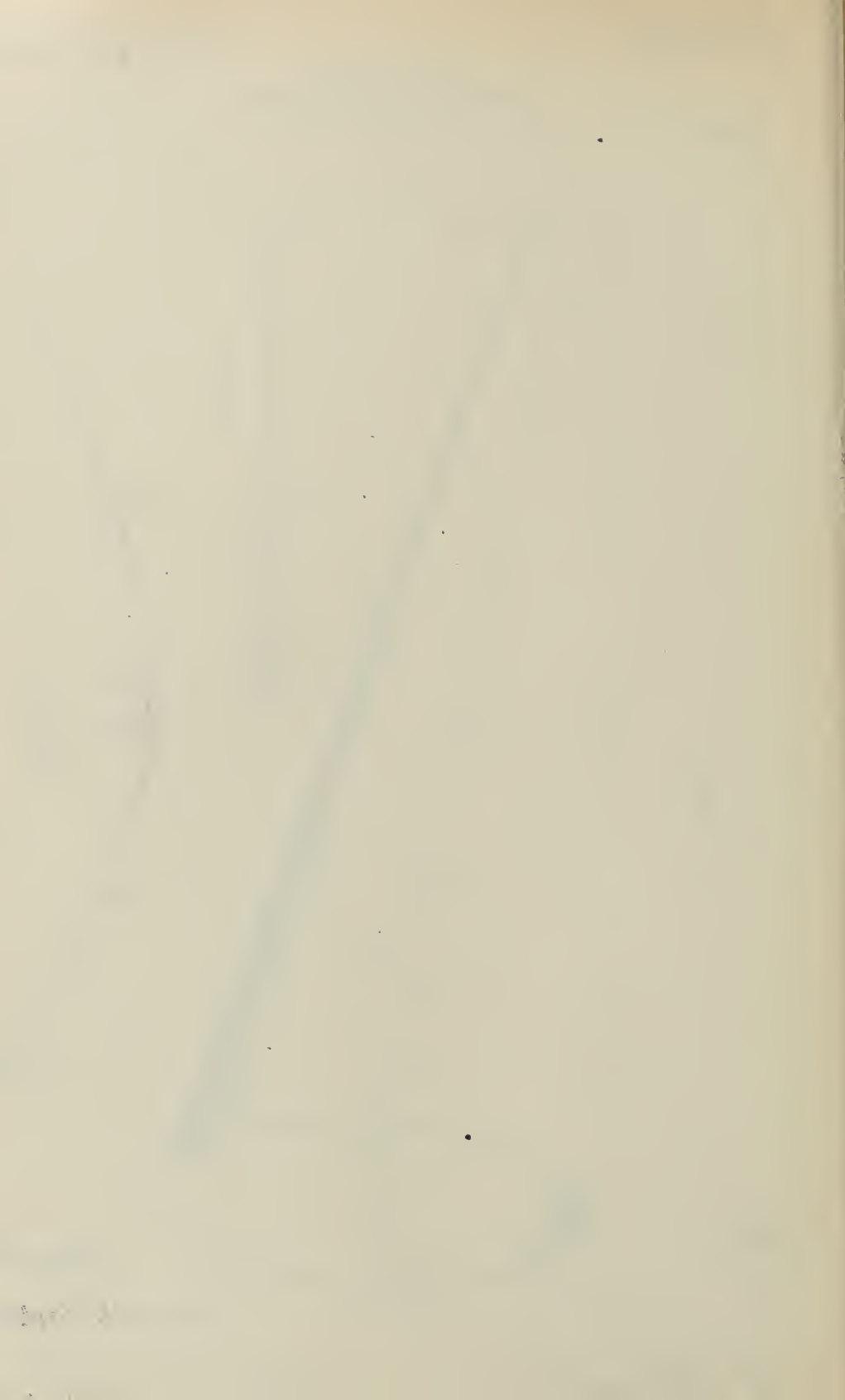
M. W. Lipham  
F. O. Geller

Inventor,

Major D. Porter;

By A. B. Lipham,  
His Attorney.





M. D. PORTER.  
COLLAPSIBLE ACOUSTIC HORN.

(Application filed July 31, 1899.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4

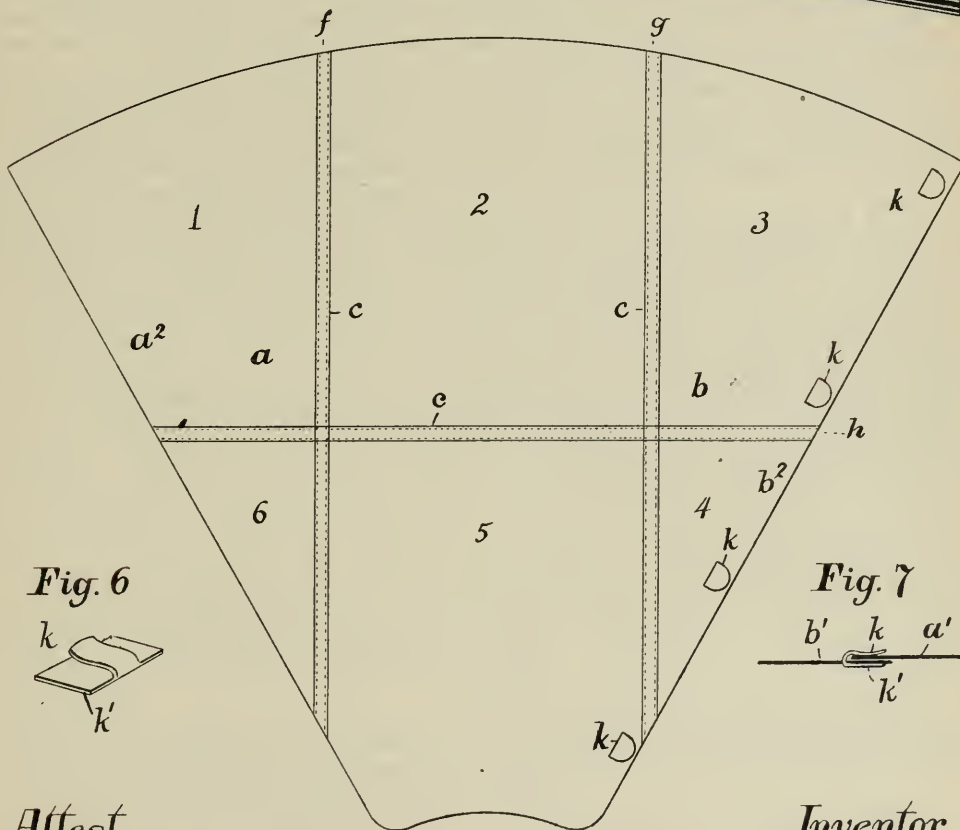
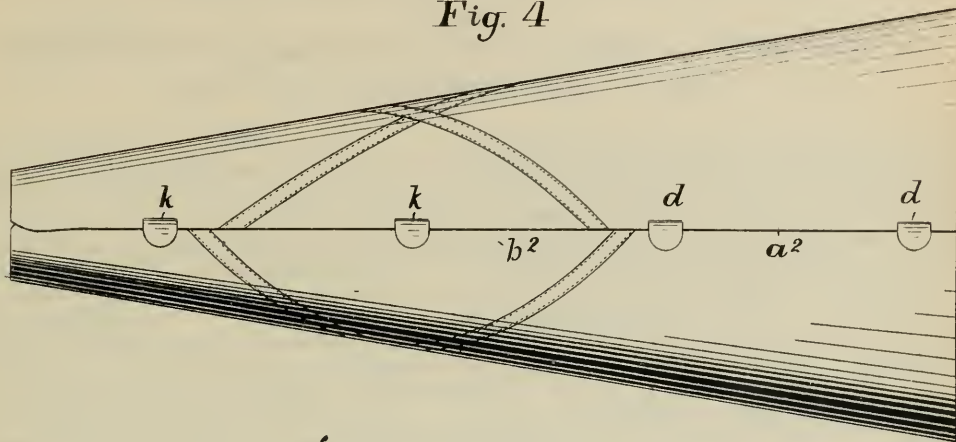


Fig. 6

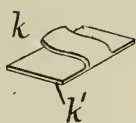


Fig. 7

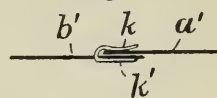


Fig. 5

Attest

M. W. Upham  
F. E. Geller

Inventor,

Major D. Porter;

By A. B. Upham,  
His Attorney



MAJOR D. PORTER, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE  
INTERNATIONAL STYLOPHONE COMPANY, OF SAME PLACE.

## COLLAPSIBLE ACOUSTIC HORN.

SPECIFICATION forming part of Letters Patent No. 648,994, dated May 8, 1900.

Application filed July 31, 1899. Serial No. 725,634. (No model.)

*To all whom it may concern:*

Be it known that I, MAJOR D. PORTER, a subject of the Queen of Great Britain, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Collapsible Acoustic Horn, of which the following is a full, clear, and exact description.

The object of this invention is the construction of a horn for general acoustic purposes, such as what is usually termed a "megaphone," or for phonographs and other talking-machines, which horn shall be capable of being folded into the smallest possible compass for greater convenience in transportation and storage, and yet can be immediately expanded into its perfect and normal condition for use. In accomplishing these results I form the horn from moderately-thin press-board, celluloid, or other material capable of ready, but not too easy, bending, and divide it longitudinally into two or more sections, with certain edges hinged together and the others provided with fastening devices easily engaged or disengaged. An ordinary hinged connection will not do for this purpose, however, as I have found from experiment, for the material being pliable only to a limited degree the hinges will become the apex of a somewhat-acute angle instead of an evenly-rounded curve. To remedy this defect in a simple and inexpensive manner, I form the hinge of some fabric or other pliable material and locate the same at some little distance back from the edge of one of the sections. By this means the outjutting edge serves as a fulcrum, which compels the material itself to bend instead of the hinge, and thereby gives to the horn the circular line in cross-section which is required.

Referring to the drawings forming part of this specification, Figure 1 is a perspective view of the horn embodying my invention. Fig. 2 is a transverse section of the same with the two sections thereof unfastened at one edge. Fig. 3 is a transverse section of said sections folded back to back. Fig. 4 is a side elevation of an improved form of my horn. Fig. 5 is a plan view of this latter horn laid flat. Fig. 6 is a perspective view of my preferred form of fastening for the edges of the

horn-sections, and Fig. 7 is a detail sectional view showing the manner in which the edges of the horn-sections are held by said fastening.

Turning to Fig. 1, it will be seen that the horn is composed of the two sections  $a$  and  $b$ , held together at the edges  $a' b'$  by a hinge  $c$ , preferably formed of fabric or leather. As shown, said edges overlap for a short distance, usually about half an inch, in order to preserve the true curve of the horn, as above set forth. For the same purpose the section edges  $a^2 b^2$  are made to overlap for a similar distance and provided with fastenings  $d$  for securing them together. Such fastenings may be the common ball-and-socket devices used for gloves and purses, as indicated in the drawings. The hinge  $c$  is adapted to permit the two horn-sections to be folded back to back, as in Fig. 3, and thereby enable the same to lie perfectly flat.

In my preferred construction I divide the horn into six sections, as shown in Fig. 5, in order to enable the same to be folded into the smallest possible compass. The lines of severance for this purpose are three in number  $f, g$ , and  $h$ ,  $f$  and  $g$  running parallel to each other and  $h$  at right angles with the others. The last of said lines of severance  $h$  is adapted to be folded in either direction, but the lines  $f g$  are hinged substantially like that of the construction illustrated in Figs. 1, 2, and 3.

The fastening devices for the edges  $a^2 b^2$  are formed, as shown in Figs. 6 and 7, where the thin base  $k'$  is provided with the thin flattened hook  $k$ . Said base is affixed to the under side of the edge  $b^2$ , preferably by being stitched thereto, with the hook  $k$  reaching through a slit therein to the upper surface thereof. (See Fig. 7.) The mouth of this hook is arranged, as in Fig. 7, in order to receive the edge  $a'$  of the opposite section, and the opening is slightly constricted to receive said edge quite tightly, and thereby securely retain it.

In knocking down this horn the edge  $a'$  is first withdrawn from the grip of the fastenings  $k$ , then the sections 1 and 6 are folded over upon the sections 2 and 5, then the sections 3 and 4 are brought over upon the first-named ones, and, finally, the superposed sections 4, 5, and 6 are folded over upon the

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combined sections 1, 2, and 3. The entire horn now occupies a space covering no more area than the single section 2, with a thickness equal to the six layers of the material composing the horn. Thus reduced in dimensions the horn can be packed in a very small compass and is hence capable of being carried from place to place in a small grip, a coat-pocket, or similarly-convenient receptacle. While this perfectly adapts the horn for use as a megaphone easy to be carried about and yet ready for use at a moment's notice, my preferable or most valued use for the same is in connection with phonographs. By packing this horn within the case arranged for the phonograph the entire talking-machine is complete, and yet occupies substantially no more space than the sounder mechanism alone. This is a most convenient arrangement for those giving phonograph entertainments at private parties or elsewhere necessitating the machine's being carried from place to place.

What I claim as my invention, and for which I desire to secure Letters Patent, is as follows, to wit:

1. In a collapsible horn, the combination of the sections formed of resilient material and hinged together along a substantially-longitudinal line, said hinge being adapted to permit said sections to be folded back to back but will compel flexure of the material itself when the free edges of the sections are brought together to form the horn, and fastening devices for said free edges, substantially as set forth.

2. In a collapsible horn, the combination of the sections formed of resilient material and hinged together along a substantially-longitudinal line, said hinge being formed of flexible material affixed to the edge of one section and a short distance back of the corresponding edge of the other section, whereby such overlapping edge is adapted to compel flexure of the material composing said sections when they are brought into the desired conical

form, and fastening devices for the free edges of said sections, substantially as and for the purpose set forth.

3. In a collapsible horn, the combination of the sections formed of resilient material and hinged together along a substantially-longitudinal line, and the fastening devices for the free edges of said sections, said fastening devices comprising the thin flat hooks having the bases affixed to the edge of one of said sections and adapted to receive and retain the edge of the other section, substantially as set forth.

4. In a collapsible horn, the combination of the plurality of sections formed of resilient material and shaped as shown, the flexible hinges securing the same together, and the fastening devices for the free edges of said sections, substantially as set forth.

5. In a collapsible horn, the combination of the sections formed of material capable of moderately-resisting flexure, the dividing-line between said sections being substantially longitudinal, and means for securing together the edges of said sections, such means being adapted to compel flexure of the sections themselves and thereby preserve the true conical shape of the horn, substantially as and for the purpose set forth.

6. In a collapsible horn, the combination of the sections formed of resilient material, the flexible hinges uniting said sections, and the fastening devices for securing together the exposed edges of said sections, two of the division-lines of said sections being parallel and substantially longitudinal therewith and the other at right angles to said parallel lines, substantially as set forth.

In testimony that I claim the foregoing invention I have hereunto set my hand this 14th day of June, 1899.

MAJOR D. PORTER.

Witnesses:

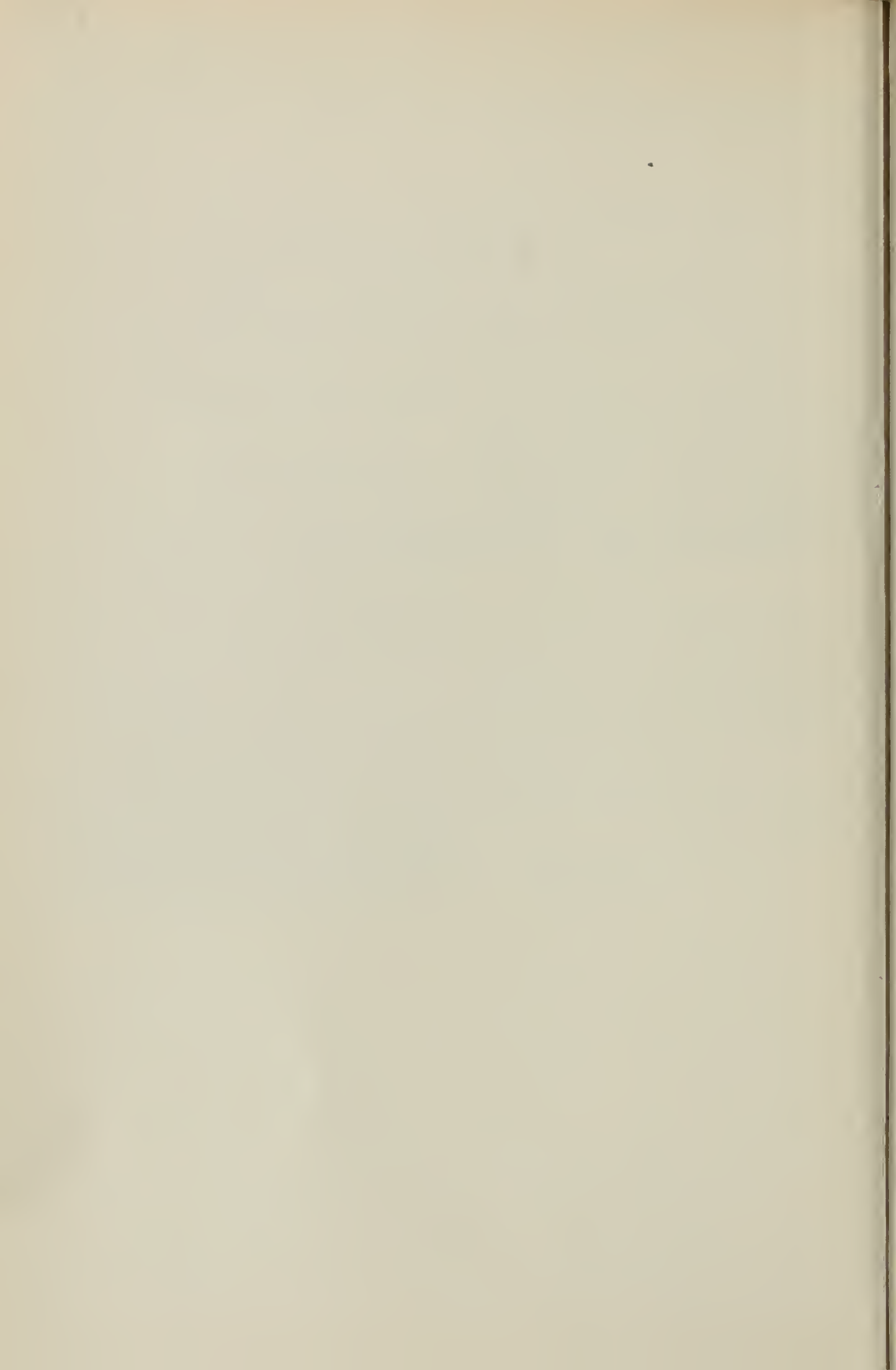
GUY H. HOLLIDAY,  
A. B. UPHAM.



[Endorsed]: District Court of the United States in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co. vs. Sherman, Clay & Co. Defendant's Exhibit Porter Patent. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit Porter Patent. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



TRADE-MARK.

No. 31,772.

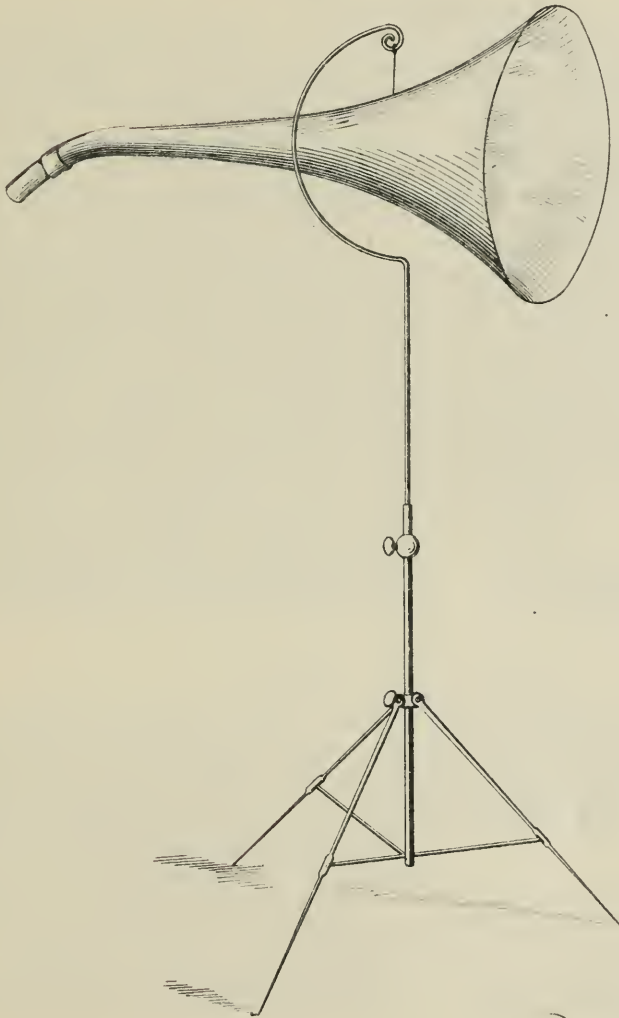
Registered July 5, 1898.

JOHN KAISER.

HORNS USED IN CONNECTION WITH SOUND PRODUCING DEVICES.

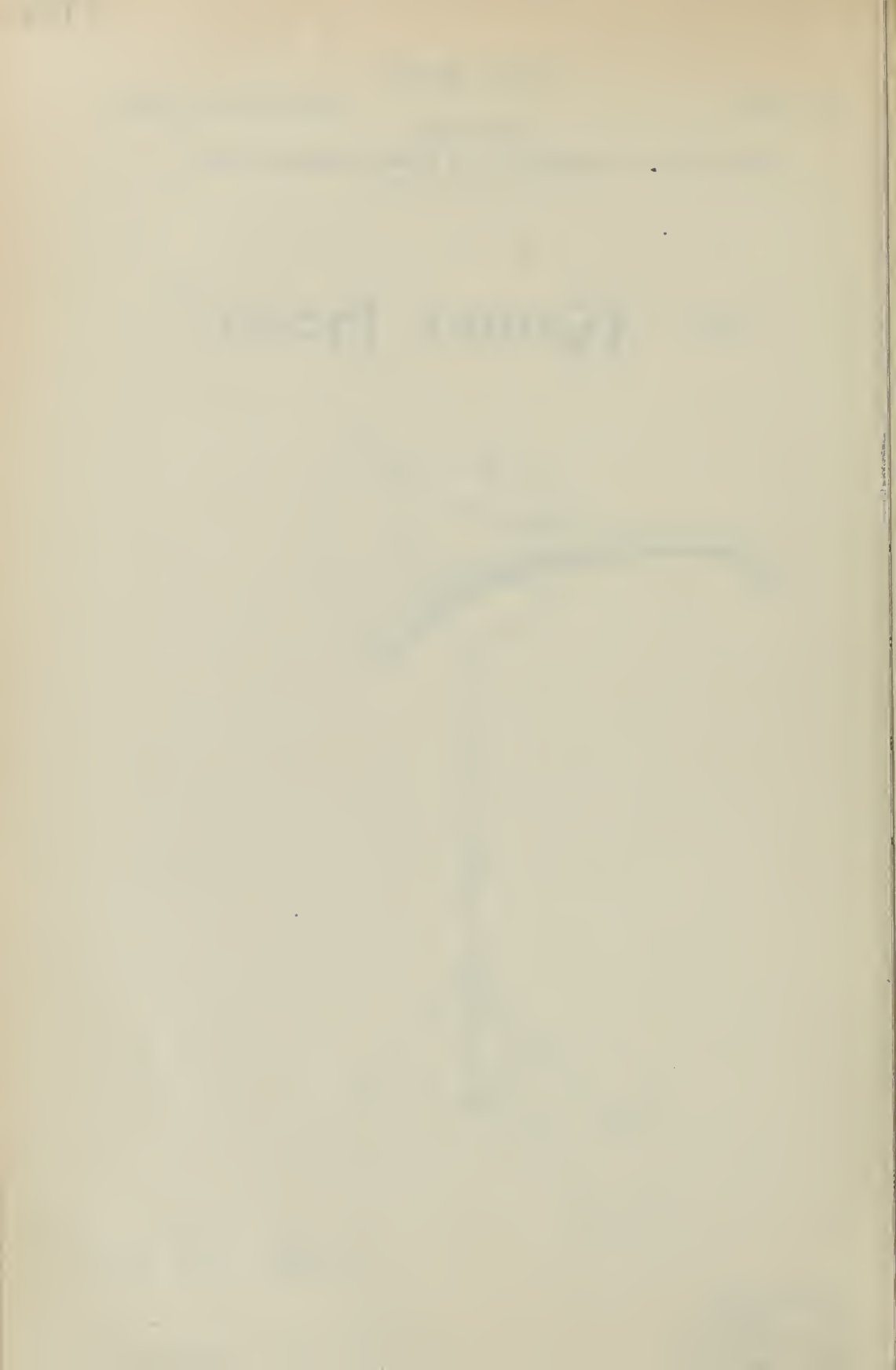
(Application filed Apr. 14, 1898.)

## The "Kaiser Horn"



Witnesses  
*Edward L. ...*  
*M. F. Keating*

*John Kaiser*  
 By the Attorney  
*Charles H. Kintner*



# UNITED STATES PATENT OFFICE.

JOHN KAISER, OF NEW YORK, N. Y.

TRADE-MARK FOR HORNS USED IN CONNECTION WITH SOUND-PRODUCING DEVICES.

STATEMENT and DECLARATION of Trade-Mark No. 31,772, registered July 5, 1898.

Application filed April 14, 1898.

## STATEMENT.

*To all whom it may concern:*

Be it known that I, JOHN KAISER, a citizen of the United States, residing at New York, in the county of New York and State of New York, and doing business at No. 110 Fifth avenue, in said city; have adopted for my use a Trade-Mark for Phonograph, Graphophone, or Gramophone Horns, of which the following is a full, clear, and exact specification.

My trade-mark consists of the words "The Kaiser Horn," arranged above a phonograph, graphophone, or gramophone horn suspended from a tripod-support. These have generally been arranged as shown in the accompanying facsimile, which represents a phonograph, graphophone, or gramophone horn yieldingly suspended from a stand. Above the horn appear the words "The Kaiser Horn" in ornamental letters; but the style of lettering is unimportant, the essential feature of my trade-mark being the words "THE KAISER HORN," arranged above a phonograph, gramophone, or graphophone horn suspended from

a tripod-support, substantially as shown in the accompanying facsimile.

This trade-mark I have used continuously in my business since September 1, 1897.

The class of merchandise to which this trade-mark is appropriated is phonograph, graphophone, gramophone, or sound-reproducing devices, and the particular description of goods comprised in said class upon which I use it is the horn or horns utilized in connection with such instruments for magnifying or intensifying the sounds as reproduced.

It has been my practice to apply my trade-mark by printing the same upon suitable labels, generally in black colors, inclosing one of such labels with each horn and its supporting-stand for shipment. I have also used it in catalogues describing the goods and upon letter-heads.

JOHN KAISER.

Witnesses:

C. J. KINTNER,  
M. F. KEATING.

## DECLARATION.

State of New York, county of New York, ss.

JOHN KAISER, being duly sworn, deposes and says that he is the applicant named in the foregoing statement; that he verily believes that the foregoing statement is true; that he has at this time a right to the use of the trade-mark therein described; that no other person, firm, or corporation has the right to such use, either in the identical form or in any such near resemblance thereto as might be calculated to deceive; that it is used by him in commerce between the United States and

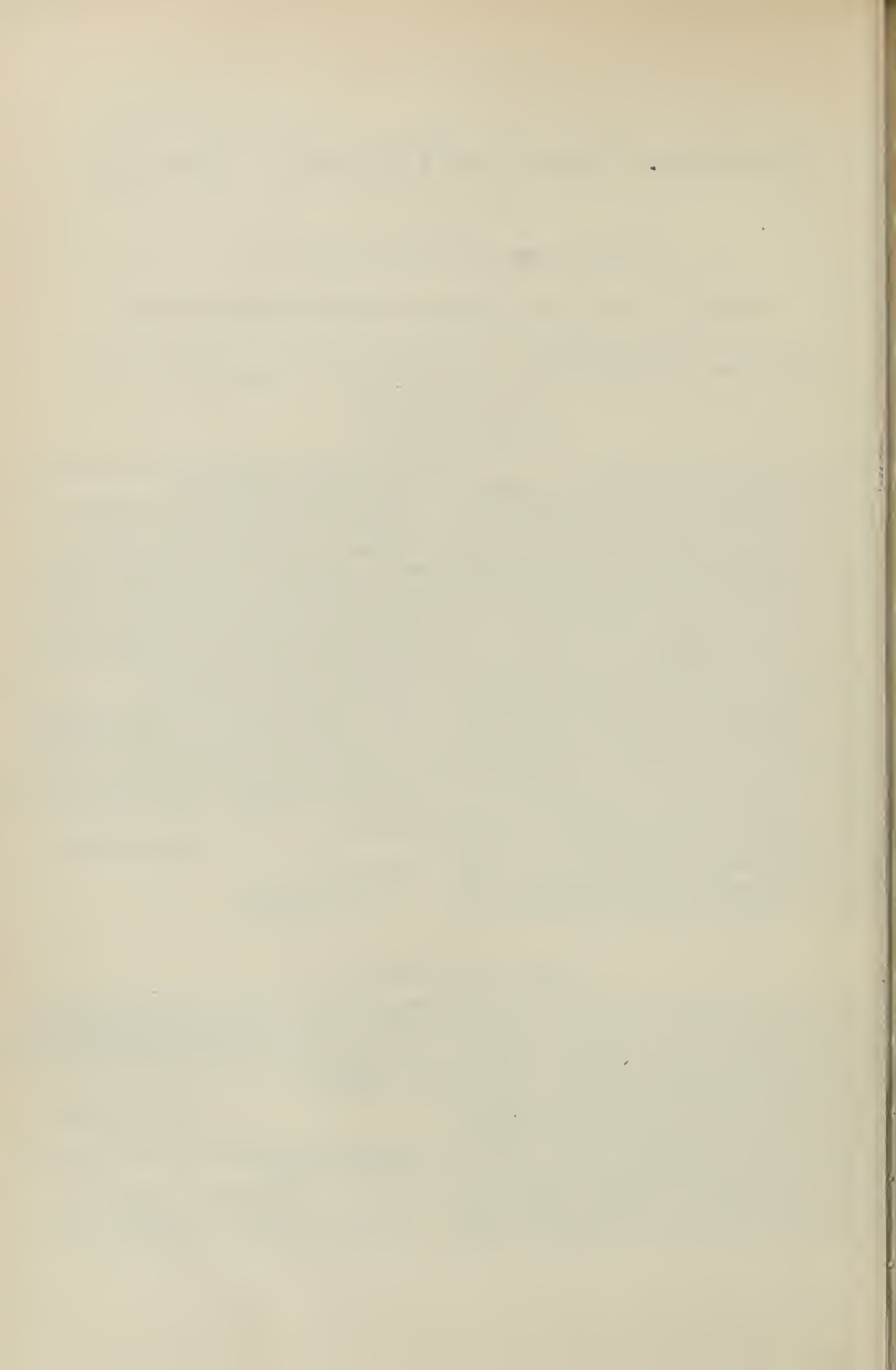
foreign nations or Indian tribes, and particularly with Canada and Great Britain; and that the description and facsimiles presented for record truly represent the trade-mark sought to be registered.

JOHN KAISER.

Sworn and subscribed to before me this 13th day of April, 1898.

[L. S.] CHARLES J. KINTNER,  
Notary Public, N. Y. Co., New York.





[Endorsed]: District Court of the United States in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co. vs. Sherman, Clay & Co. Defendant's Exhibit Kaiser Trademark. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit of Appeals for the Ninth Circuit. Defendant's Exhibit Kaiser Trademark. Filed Apr. 8, 1916. F. D. Monckton, Clerk.

OFFICE NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION

du 17 février 1902.

XII. — Instruments de précision.

N° 318742

2. — APPAREILS DE PHYSIQUE ET DE CHIMIE.

*Brevet demandé le 17 février 1902 par M. TURPIN, pour un système de cornet en bois pour phonographe. (Délivré le 4 juillet 1902; publié le 25 octobre 1902.)*

PRINCIPE :

Jusqu'ici les cornets des phonographes servant, soit à l'enregistrement, soit à la reproduction, sont de quatre espèces :

- 1° En carton;
- 2° En celluloïd;
- 3° En verre ou en cristal;
- 4° En métal : cuivre, fer-blanc, nickel, aluminium, maillechort, etc.

Le carton, le celluloïd ou fibroïne, ne donnent que de très mauvaises vibrations. Le cristal n'a pas eu de succès parce que les vibrations sont trop aiguës et que les cornets sont trop lourds et trop fragiles.

Les cornets en métal sont, en somme, les seuls employés.

Ces cornets donnent, quoi que l'on fasse, des sons métalliques nasillards qui enlèvent tout l'intérêt que pourrait avoir le phonographe en lui-même, car il est impossible de reconnaître les voix enregistrées, parce que les sons sont dénaturés. C'est ainsi que le violon ne peut être rendu convenablement par un phonographe; que les notes élevées d'une bonne chanteuse légère sont dénaturées et accompagnées d'un sifflement métallique qui trouble l'ensemble, que les morceaux d'orchestre sont confus, etc.

Tous ces inconvénients qui nuisent absolument à la phonographie et qui ont empêché que le phonographe, remarquable à plus d'un point de vue, ne prenne le caractère sérieux et scientifique qu'il devrait avoir, sont dus à la

nature métallique des cornets qui transforment en une voix métallique la voix la plus pure, d'abord à l'enregistrement et, ensuite, à la reproduction, d'où, finalement, une voix de polichinelle sur tous les tons et pour toutes les voix.

Comme conséquences de cet état de choses, le phonographe restant un simple et souvent désagréable joujou, au lieu d'être un appareil reproduisant fidèlement les sons tels qu'il les aurait reçus, c'est-à-dire un instrument parfait permettant de reconnaître facilement les voix enregistrées.

En recherchant les causes de cette grave et perturbante défectuosité, j'ai été frappé, dès le début de mes recherches, que l'on se soit ingénié, en effet, à faire passer une magnifique voix de cantatrice ou de ténor, dans un cor de chasse ou dans une trompette, pour enregistrer, d'abord et, ensuite, pour reproduire les morceaux de chant. L'effet obtenu, d'une manière continue et sans désespérer, c'est-à-dire sans y avoir remédié depuis l'invention du phonographe, ne pouvait rien avoir de surprenant si on étudie scientifiquement le sujet.

Il est bien évident qu'un solo de violon, de violoncelle, de hautbois ou de voix humaine, 60 étant émis dans une trompette et reproduit à l'aide d'une trompette métallique, sera complètement perdu et dénaturé par la discordance des vibrations et la cacophonie qui résultent des vibrations asynchrones qui se produisent.

Ce fait étant établi, par mes expériences,

j'ai recherché comment on pourrait obvier à ces défauts, et après avoir essayé différents systèmes j'ai reconnu que le bois convenablement travaillé et choisi pouvait remédier à la défectuosité des phonographes actuels et rendre ces appareils parfaits. Le bois, en effet, donne des vibrations si naturelles qu'il s'accorde avec tous les instruments et surtout avec la voix humaine qu'il permet d'enregistrer et de rendre avec une douceur, une netteté et une fidélité extrêmes et les nuances les plus délicates. On sait, en effet, que les instruments en bois, soit à cordes, soit à vent, sont ceux qui se rapprochent le plus de la voix humaine, tels sont le violon, le violoncelle, le hautbois, etc. Le bois est donc de toutes les matières celle qui convient le mieux à la confection d'un cornet phonographique, comme je l'ai reconnu.

D'ailleurs, je serai remarquer ici, et c'est très important, au point de vue du principe, que dans l'industrie des phonographes on n'a pas l'air de se préoccuper d'obtenir des sons purs et mélodieux, mais seulement beaucoup de bruit. Du bruit, c'est à quoi visent tous les cornets en fer-blanc, en aluminium, etc. On ne s'est occupé de leur forme en trompette ou en cor de chasse qu'en vue d'obtenir plus de force. Seulement au fur et à mesure que le bruit augmente, les sons nasillards et métalliques augmentent aussi et à tel point que dans un morceau d'orchestre on distingue seulement les gros instruments de cuivre tandis que tous les instruments délicats, violons, harpes, violoncelles, hautbois, etc., se confondent en un sifflement désagréable et comparable à une machine qui grippe, à tel point que l'on croit, lorsque l'oreille n'y est pas faite, que c'est le mécanisme du phonographe qui en est cause.

Un appareil, même très ordinaire, muni d'un cornet en bois de mon système, donne un enregistrement et une reproduction très supérieurs à ceux obtenus avec des cornets métalliques.

Les sons émis par les instruments de cuivre, au lieu d'être évalués comme avec un cornet métallique, sont rendus fidèlement, plutôt un peu adoucis en laissant dominer le chant.

Tels sont les principes, études et observations qui m'ont amené à appliquer le bois de la manière suivante, à l'industrie des phonographes.

## PROCÉDÉS DE CONSTRUCTION

Pour que les cornets en bois donnent satisfaction il faut qu'ils soient en bois très minces et très secs, convenablement choisis et travaillés. Les formes convenables ainsi que la légèreté de l'appareil présentent de grandes difficultés que j'ai tournées de la manière suivante.

## 1° Cornets en bois tourné.

Ce genre de cornets, le premier qui se présente à l'esprit, est très difficile à obtenir à cause des grandes dimensions et du peu d'épaisseur nécessaires qu'il faut atteindre. En outre tous les bois ne permettent pas d'arriver au résultat. L'acajou, le palissandre, l'acacia, le noyer sont chers, on les trouve difficilement en gros blocs et ils sont cassants. Le bois blanc se désagrége, le hêtre ou le tulipier d'Amérique donnent les meilleurs résultats.

Pour obtenir un cornet tourné, on commence par tourner l'extérieur du bloc de bois à la forme voulue, puis on ébauche l'intérieur suivant le profil extérieur désiré. Ensuite on fixe la pièce ainsi préparée à l'extérieur et ébauchée à l'intérieur, B, dans un mandrin en bois ou en métal *ad hoc* M (fig. 1), destiné à maintenir les parois du cornet, pendant que l'on finit, au tour, l'intérieur, afin d'éviter qu'il se déforme et se brise sous l'effort de l'outil. Malgré ces précautions on en perd beaucoup et il y a une grande dépense de bois perdu.

Ces difficultés m'ont engagé dans une autre voie, celle d'employer du bois de placage en feuilles tranchées ou sciées. Les bois ainsi préparés m'ont permis d'établir des types d'études très pratiques à l'aide des modes et moyens de construction que j'ai combinés. Les bois que j'emploie sont le palissandre, l'acajou, l'acacia, le tulipier à violon, guitare, mandoline, etc., le noyer, le hêtre. Ces bois peuvent être employés seuls ou mélangés, soit par contre-placage à fils croisés, soit par assemblage de lames. Les épaisseurs peuvent varier de un demi-millimètre à cinq millimètres, exceptionnellement pour les grandes dimensions.

2° Cornets en bois de placage d'une seule pièce  
(fig. 2, 3, 4, 5, 6 et 7).

Si on veut un cornet d'une seule pièce, on trace suivant le cône désiré une développante dudit cône (fig. 2 en réduction) pour en tirer un calibre ou gabarit en métal : zinc, cuivre,

[318742]

APPAREILS DE PHYSIQUE ET DE CHIMIE.

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etc., qui sert ensuite à tracer les feuilles de placage que l'on superpose en grand nombre, 25, 30 ou 50, suivant l'épaisseur, et que l'on découpe à la scie à ruban ou autre.

- 5 Les pièces ainsi découpées sont plongées dans l'eau bouillante ou mieux dans une étuve à vapeur très humide et à basse pression, 1 kilogramme et demi tout au plus, pendant une heure environ. Dans ce temps le bois est devenu extrêmement mou et souple. Vivement, 10 alors, on saisit chaque pièce découpée et ramollie, B, que l'on enroule sur elle-même, dans le sens voulu, et on l'enfile sur un moule ou forme F, analogue aux formes à pains de 15 sucre, et sur cette feuille de bois B, on applique, de suite, une autre forme F pour maintenir B, jusqu'à complet refroidissement. On superpose ainsi un plus ou moins grand nombre de feuilles de bois ramolli et de formes, 20 à volonté. Les formes doivent être chauffées dans l'eau bouillante préalablement; elles sont en métal tourné sur les deux faces qui servent toutes deux. On les prend à la main par une traverse réservée ou rivée dans le métal (fig. 3 25 et 4). Lorsque tout est refroidi on démoule les pièces et on procède au collage latéral C, par recouvrement à l'aide d'une colle forte de bonne qualité. On maintient le collage soit à la presse, soit sous des formes analogues aux 30 formes F, mais en toile métallique pour laisser l'air circuler et faciliter le séchage. Ensuite, après séchage on fixe le cône creux en bois ainsi obtenu dans l'embouchure métallique E, soit de préférence par collage, soit par clouure 35 (fig. 5, 6 et 7, vues en bout et en coupe de l'embouchure). Enfin on polit la pièce et on la vernit à la gomme laque, à la manière des luthiers. Le vernis augmente la sonorité et préserve le bois. On a ainsi un cornet instrumental et non pas un simple cornet-conducteur 40 du son.

### 3° Cornets en bois de placage en plusieurs pièces.

- La figure 8 représente un cornet en bois, 45 de forme polygonale (octogone) qui est construit par lames B, clouées et collées, ou l'un ou l'autre, sur des baguettes de bois A (fig. 9 et 10, vue en bout) servant d'armature ou de carcasse. La pyramide tronquée ainsi 50 obtenue est ensuite collée en C dans une embouchure E en métal quelconque. On termine ensuite l'objet, comme il a été dit plus haut.

En place d'armatures en bois on peut faire usage d'armatures métalliques A (fig. 10, 11 et 13) pour recevoir et maintenir les feuilles 55 ou lames de bois B. Ces armatures peuvent être, à l'intérieur ou à l'extérieur du cornet, lequel peut varier de formes, depuis la forme circulaire (cône) jusqu'au carré en passant par toutes les formes pyramidales à côtés mul- 60 tiples.

Les figures 14, 15 et 16 représentent un cornet, tronconique, à courbure en pavillon; avec armature métallique. Une couronne repliée A forme l'armature du pavillon dans 65 laquelle s'engagent les lames de bois B; l'embouchure E porte une enveloppe isolée concentrique, mais soudée à sa base. Dans l'espace réservé entre les parois doubles ainsi formées (fig. 16), on engage et on colle le sommet du 70 cône en bois B, la base étant fixée dans la couronne de pavillon. Pour maintenir la courbure, on peut engager à l'extérieur un anneau métallique ou autre, O, relié à l'embouchure E par des tiges T soudées, collées ou rivées, en S 75 et en O. Les feuilles de placage ainsi maintenues peuvent affecter les formes désirées, en faisant varier la forme des carcasses et armatures et le tracé des lames de bois. Les joints, si besoin en est, sont fermés avec des bandes 80 de placage extrêmement minces et collées.

### 4° Cornets en bois combinés.

Pour obtenir une concordance des sons plus complète par synchronisme et isochronisme, 85 on peut composer avantageusement les cornets, de lames de bois d'essences diverses et même y ajouter une ou deux lames de métal et même de verre, de manière que lorsque l'on enregistrait un morceau d'orchestre, tous les 90 instruments trouvassent leurs harmoniques et que le cornet puisse vibrer à l'unisson. Si, par exemple, le cornet est une pyramide duodécagonale, soit à 12 lames, on pourrait mettre en 95 opposition.

- 2 lames en palissandre, 95
- 2 lames de métal qui peuvent être composées de bandes de métaux divers,
- 1 lame de verre,
- 2 lames de tulipier,
- 2 lames d'acajou rouge, 100
- 2 lames de noyer.

On obtiendrait ainsi un cornet orchestral idéal.



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## APPAREILS DE PHYSIQUE ET DE CHIMIE.

[318742]

Pour la voix et le chant, le violon, les instruments de bois; il ne faut mettre que du bois, mais varier les espèces, ce que permet la forme polygonale de mes cornets.

5 On conçoit, en effet, que tous les bois ne vibrent pas également. Ainsi le noyer et le hêtre rendent très bien les sons graves; le tulipier et les bois blancs, les médiums, et l'acajou et le palissandre les notes élevées. Ces  
10 différents bois se soutiennent entre eux et renforcent les sons en vibrant à l'unisson de leurs harmoniques comme les cordes d'un piano ou d'une harpe.

15 Tels sont les perfectionnements et procédés que j'entends breveter par les présentes.

## REVENDEICATIONS.

En conséquence, je revendique pour une période de quinze années :

1° L'application industrielle des bois divers  
20 à la confection spéciale des cornets pour phonographes, en conséquence des principes, études et observations et avantages particuliers que j'ai fait connaître ci-dessus et dans le but  
spécifié.

Notamment, la conservation du timbre de 25 la voix ou de l'instrument;

2° Les moyens de construction desdits cornets, à l'aide du tour et mandrins, comme ci-dessus décrit et dans le but spécifié;

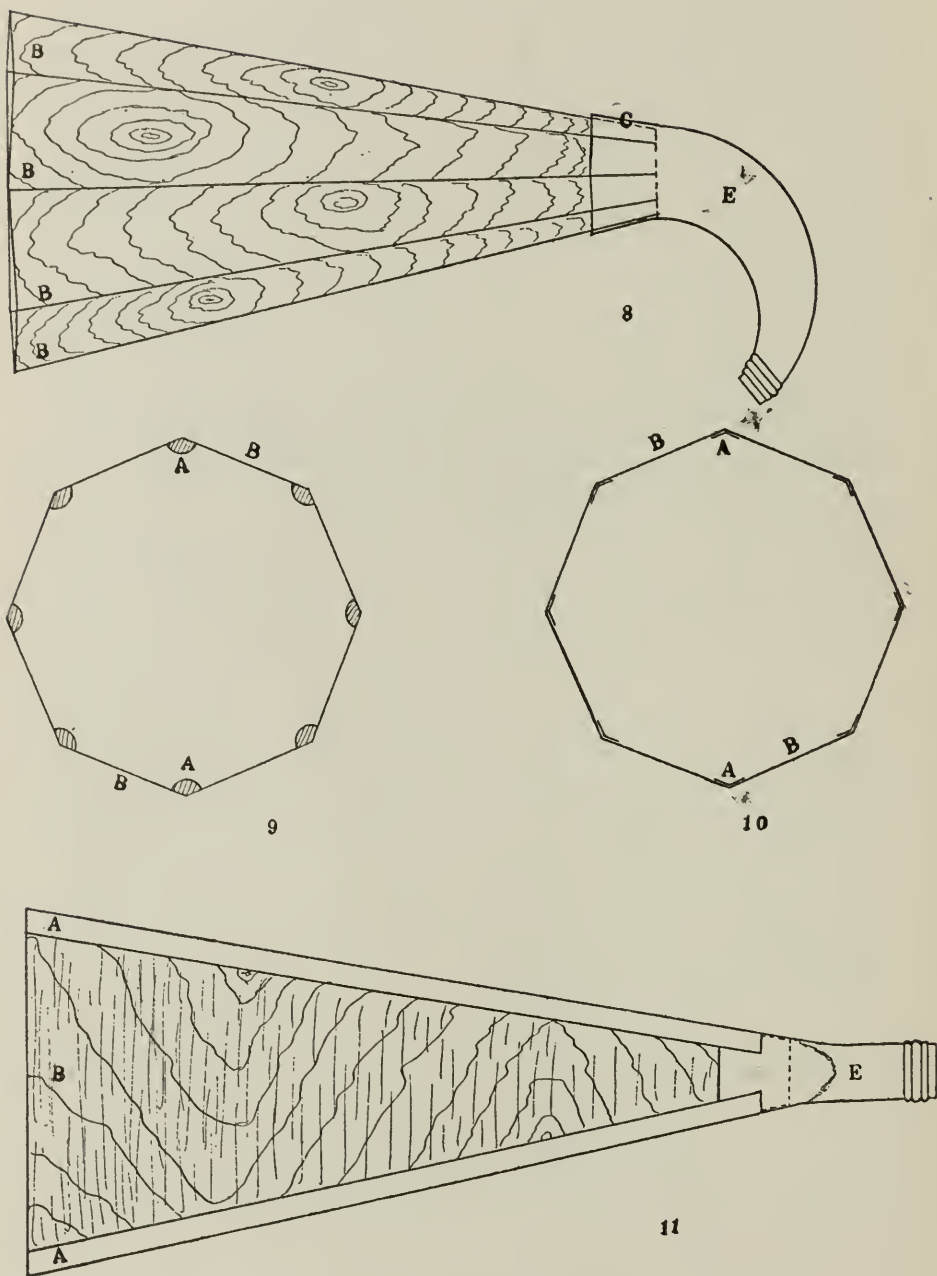
3° Les procédés de construction et façon- 30 nement de cornets d'une seule pièce à l'aide de bois de placage ramolli à la vapeur d'eau et de moulage et appareils et lesdits appareils, comme ci-dessus décrit et dans le but spécifié;

4° Les procédés de confection desdits cor- 35 nets à l'aide de bois de placage débités en lames et fixées sur des armatures en bois ou en métal quelconque, internes ou externes, quelles qu'en soient les formes et dimensions, comme ci-dessus décrit et dans le but spécifié; 40

5° Les procédés de construction et de combinaison des cornets combinés, ces cornets eux-mêmes, à plusieurs bois différents, avec ou sans verre ou métaux à vibrations, comme ci-dessus décrit et dans le but spécifié. 45

Février 1902.

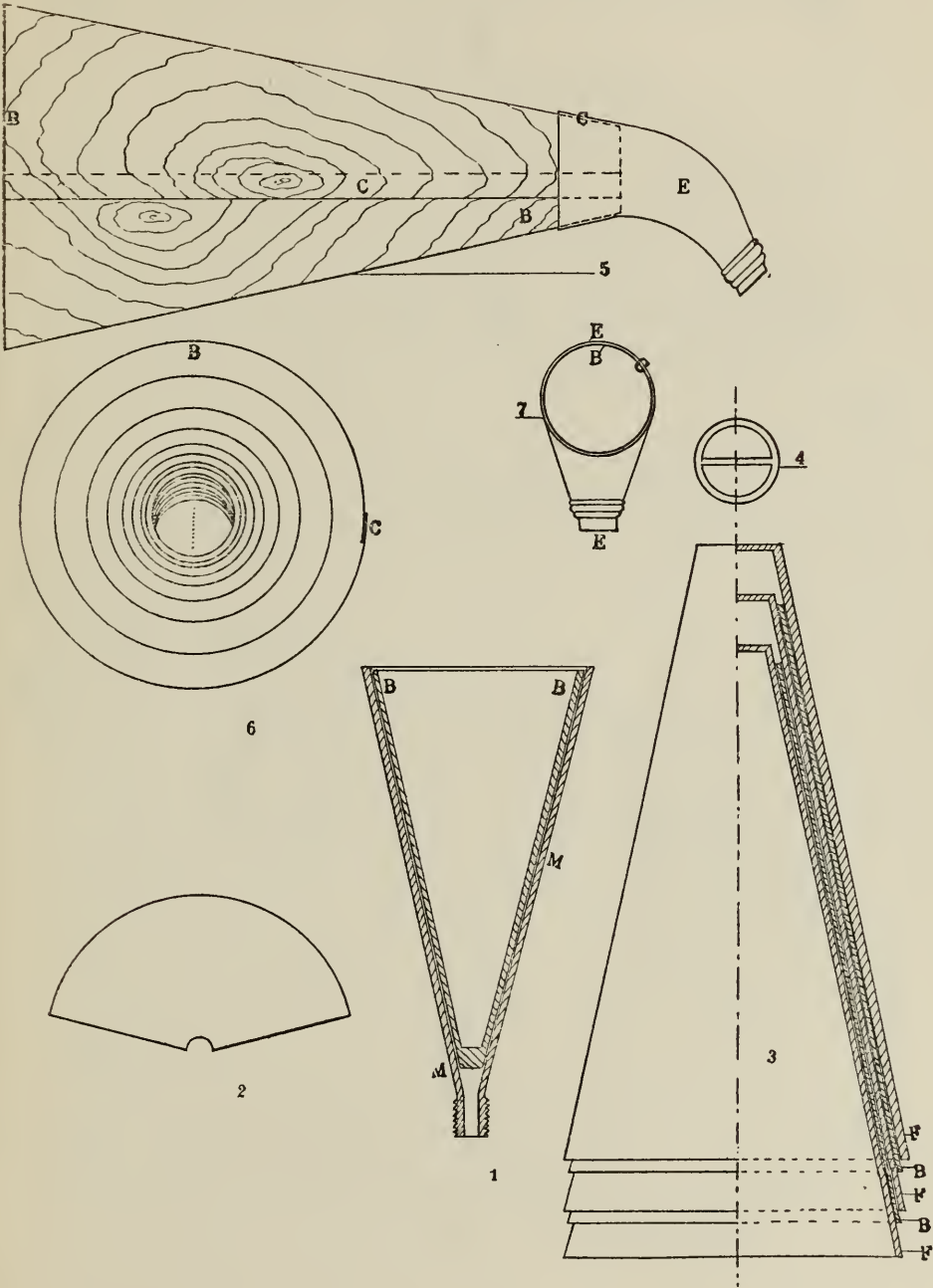
Eug. TURPIN.



N° 318742

M. Turpin

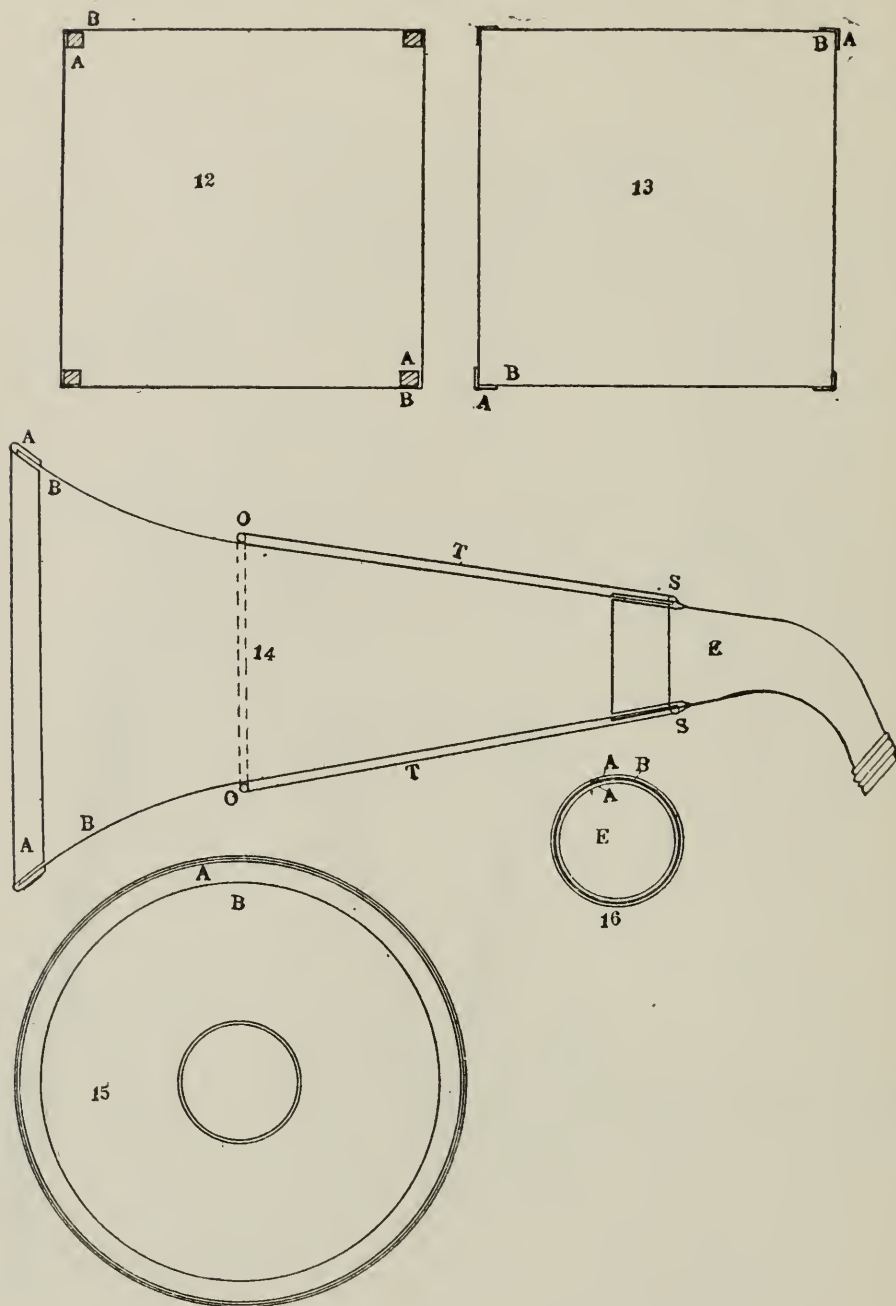
3 planches. — PL I



N° 318742

M. Turpin

3 planches. — Pl. III



FRENCH REPUBLIC.  
NATIONAL OFFICE OF INDUSTRIAL PROP-  
ERTY.

PATENT OF INVENTION

of February 17, 1902.

XII.—Instruments of Precision. No. 318,742.

2.—Physical and chemical apparatus.

Patent applied for February 17, 1902, by M. Turpin,  
for a design for a horn of wood for a phono-  
graph. (Delivered July 4, 1902; published Oc-  
tober 25, 1902).

PRINCIPLE.

Heretofore horns for phonographs serving either  
for recording or for reproduction have been of four  
kinds:

- 1st. Of pasteboard;
- 2nd. Of celluloid;
- 3rd. Of glass or of crystal;
- 4th. Of metal; copper, tin, nickel, aluminum,  
German silver, etc.

Pasteboard, celluloid or fibre give only very bad  
vibrations. Crystal has not been successful because  
the vibrations are too sharp, and the horns are too  
heavy and too fragile.

Horns of metal are, in short, the only ones em-  
ployed.

These horns give, whatever one may do, metallic,  
nasal sounds which take away all interest which the  
phonograph might have in itself, for it is impossible



to recognize the recorded sounds, because the sounds are unnatural. It is thus that the violin cannot be suitably reproduced by a phonograph; that the high notes of a good light singer are unnatural and accompanied by a metallic hissing which disturbs the ensemble, that orchestral pieces are confused, etc.

All these disadvantages which absolutely harm the phonograph and which have prevented the phonograph, which is remarkable from more than one point of view, from acquiring the serious and scientific character which it ought to have, are due to the metallic nature of the horns which transform into a metallic sound a sound the most pure, first in the recording and then in the reproduction, whence finally into a sound of mockery for all tones and for all sounds.

As a consequence of this state of things, the phonograph remains a simple and often disagreeable toy, instead of being an apparatus faithfully reproducing sounds such as it may have received, that is to say a perfect instrument permitting easy recognition of the recorded sounds.

In searching for the causes of this serious and disturbing defectiveness, I have been surprised from the beginning of my researches, that one may try in vain, to cause a magnificent voice of a singer or tenor to pass in a hunting horn or in a trumpet first for the recording and then for the reproducing of the pieces of song. The effect obtained, in a manner continued and without change, that is to say without having remedied it since the invention of

the phonograph can have nothing of surprise if one studies the subject scientifically..

It is very evident that a solo of a violin, of a violoncello, of an oboe or of the human voice, being emitted into a trumpet and reproduced by the aid of a metallic trumpet, will be completely lost and rendered unnatural by the discord of the vibrations and want of harmony which result from the asynchronous vibrations which are produced.

This fact being established, by my experiences, I have sought how one could obviate these defects, and after having tried different plans I have observed that wood suitably worked and selected can remedy the defectiveness of the present phonographs and render these instruments perfect. Wood, indeed, gives vibrations so natural that it accords with all instruments and above all with the human voice which it permits to be recorded and to be reproduced with a softness, a clearness and an extreme fidelity and the most delicate shades. One knows, indeed, that instruments of wood, whether string instruments or wind instruments, are those which approach the most to the human voice. Such are the violin, the violoncello, the oboe, etc. Wood is then of all materials that which conforms the best to the composition of a phonographic horn, as I have observed.

In addition, I would remark here, and it is very important, from the point of view of the principle, that in the phonograph industry one does not pretend to attempt to obtain sounds pure and melodious, but only much noise. Noise, that is what all

horns of tin, of aluminum, etc., aim at. One is concerned with their form, as a trumpet or hunting horn, only with a view of obtaining more force. Only in proportion as the noise increases do the nasal and metallic sounds also increase and to such a point that in an orchestral piece one distinguishes only the large instruments of copper while all the delicate instruments, violins, harps, violoncellos, oboes, etc., are confused in a hissing that is disagreeable and comparable to a machine that catches, to such a point that one thinks, when the ear is not accustomed to it, that it is the mechanism of the phonograph which is the cause of it.

An apparatus, even very ordinary, provided with a horn of wood of my design, gives a recording and a reproduction very superior to those obtained with metallic horns.

The sounds emitted by instruments of copper, instead of being elevated as with a metallic horn, are rendered faithfully, rather a little softened, permitting the song to dominate.

Such are the principles, studies and observations which have led me to apply wood in the following manner to the phonograph industry.

#### PROCESS OF CONSTRUCTION.

In order that horns of wood may give satisfaction it is necessary that they be of wood very thin and very dry, suitably selected and worked. The suitable forms as well as the lightness of the apparatus present great difficulties which I have resolved in the following manner:

## 1st. Horns turned in wood.

This kind of horns, the first which presents itself to the mind is very difficult to obtain because of the large dimensions and of the small thickness which it is necessary to attain. Besides all woods do not permit of obtaining the result. Mahogany, rosewood, acacia and walnut are dear, one finds them difficult in large blocks and they are fragile. White wood disintegrates, the beech or the tulip of America gives the best results.

In order to obtain a turned horn, one begins by turning the exterior of the block of wood to the form desired, then one fashions the interior following the exterior outline desired. Then one fixes the piece B, thus prepared on the exterior and fashioned on the interior, in a mandrel M (fig. 1) of wood or of metal for this purpose, intended to maintain the walls of the horn while one finishes it in turn on the interior, in order to avoid deformation and breaking under the effort of the tools. Notwithstanding these precautions one loses many of them and there is a great expense for wood lost.

These difficulties engaged me in another way, that of employing wood for veneering cut or sawed into sheets. Woods thus prepared have permitted me to construct types for study very practical by the aid of methods and means of construction which I have combined. The woods which I employ are rosewood, mahogany, acacia, tulip used for the violin, guitar, mandolin, etc., walnut, and beech. These woods can be employed alone or mixed either by counter-veneering in cross order or by the assem-

blage of strips. The thickness may vary from a one-half mm. to 5mm. used exceptionally for large dimensions.

2nd. Horns of wood for veneering in a single piece (fig. 2, 3, 4, 5, 6, and 7).

If one wishes a horn of one piece, one spreads out according to the cone desired, an unfolded pattern of the cone (fig. 2 on a small scale) in order to obtain therefrom a caliber or model in metal, zinc, copper, etc., which then serves for outlining the sheets for veneering which one superimposes in great number, 25, 30 or 50, according to the thickness, and which one cuts out with a ribbon or other saw.

The pieces thus cut out are immersed in boiling water or rather in a steam-oven very humid and of low pressure, one kilogram and a half in all at the most, for about an hour. During this time the wood becomes extremely soft and supple. Quickly then one takes each cut and softened piece, B, which one folds upon itself, in the manner desired, and one places it on a mold or form F. similar to forms for sugar-bread, and upon this sheet of wood B one applies then another form F in order to maintain B until complete cooling. One super-imposes thus a more or less large number of sheets of softened wood and of forms as desired. The forms should be heated in boiling water, preferably; they are of metal turned upon the two faces both of which are used. One takes them in the hand by a cross-piece left or riveted in the metal (fig. 3 and 4). When all is cold one takes the pieces from the molds and proceeds to the lateral joint C securing it by means of a



strong glue of good quality. One maintains the joint either by pressure or under forms similar to forms F, but of metal cloth in order to let the air circulate and to facilitate the drying. Then after the drying one secures the hollow cone of wood thus obtained in the metallic mouth-piece E, either preferably by gluing or by nailing (fig. 5, 6 and 7, end and foreshortened views of the mouth-piece). Finally one polishes the piece and varnishes it with a shellac, in the manner employed by instrument makers. The varnish increases the sonorousness and preserves the wood. One has then an instrumental horn and not a simple horn, that is a conductor of sound.

3rd. Horns of wood for veneering in several pieces.

Figure 8 represents a horn of wood, of polygonal form (octagonal) which is constructed of strips B, nailed and glued, or one or the other, upon ribs of wood A (figs. 9 and 12, end views) serving as bracers or as a skeleton. The truncated pyramid thus obtained is then glued at C in a mouth-piece E of any metal. One then finishes the matter in the manner which has been set forth above.

In place of ribs of wood one can make use of metallic ribs (figs. 10, 11 and 13) to receive and maintain the sheets or strips of wood B. These ribs may be on the interior or on the exterior of the horn, which may vary in form, from the circular form (cone) to that of a square, passing through all the pyramidal forms having a plurality of sides.

Figures 14, 15 and 16 show a truncated bell-shaped horn, with metallic bracing. A folded ring A forms

the bracing of the bell in which the strips of wood B are engaged; the mouth-piece E carries a concentric envelope, detached but soldered at its base. In the space reserved between the double walls thus formed (fig. 16), the top of the cone of wood B is engaged and glued, the base being secured in the bell ring. To maintain the curvature, one may secure to the exterior a metallic or other ring O, connected to the mouth-piece E by rods T, soldered, glued or riveted at S and at O. The sheets of veneering, thus maintained, can effect the forms desired, by varying the form of the skeleton and ribs and shape of the sheets of wood. The joints, if there is need of it, are secured by bands of veneering wood very thin and glued.

#### 4th.    Horns of woods combined.

In order to obtain a more complete concordance of the sounds by synchronism or isochronism, one may advantageously construct the horns or strips of wood of different kinds and also add thereto one or two strips of metal and also of glass, so that when one records an orchestral piece, all the instruments find their harmonies and that the horn can vibrate in unison. If, for example, the horn is a duo-decagonal pyramid, that is with 12 strips, one may put in opposition:

2 strips of rosewood;

2 strips of metal which may be composed of bands of different metals;

2 strips of glass;

2 strips of tulip;

2 strips of red mahogany;

2 strips of walnut.

One obtains thus an ideal orchestral horn.

For the voice and the song, the violin, the instruments of wood, it is necessary not only to employ wood, but to vary the kinds, which the polygonal form of my horns permits.

One understands, indeed, that all the woods do not vibrate equally. Thus the walnut and the beech render very well the grave sounds; the tulip and the white woods, the medium, and the mahogany and the rosewood the high notes. These different woods keep up among them and reinforce the sounds in vibrating in unison with their harmonics like the strings of a piano or of a harp.

Such are results and methods which I intend to patent by these presents.

#### CLAIMS.

Therefore, I claim for a period of fifteen years:

1st. The industrial application of different woods to the special construction of horns for phonographs, according to the principles, studies and observations and particular advantages which I have set forth above and finally specified.

Especially the conservation of the quality of the voice and of the instrument.

2d. The means of construction of said horns, by the use of a turning lathe and mandrels, as above described and finally specified.

3d. The methods of construction and fashioning of horns in a single piece by the use of wood for veneering softened by steam and of molding and brac-

ing and said apparatus, as above described and finally specified.

4th. The methods of construction of said horns by the use of wood for veneering cut into strips and secured upon ribs of wood or of any metal, internally or externally whatever may be their forms and dimensions, as described above and finally specified.

5th. The methods of construction and the combinations of combined horns, those horns of several different woods, with or without vibrating glass or metals, as above described and finally specified.

EUG. TURPIN.

February, 1902.

No. 759,639.

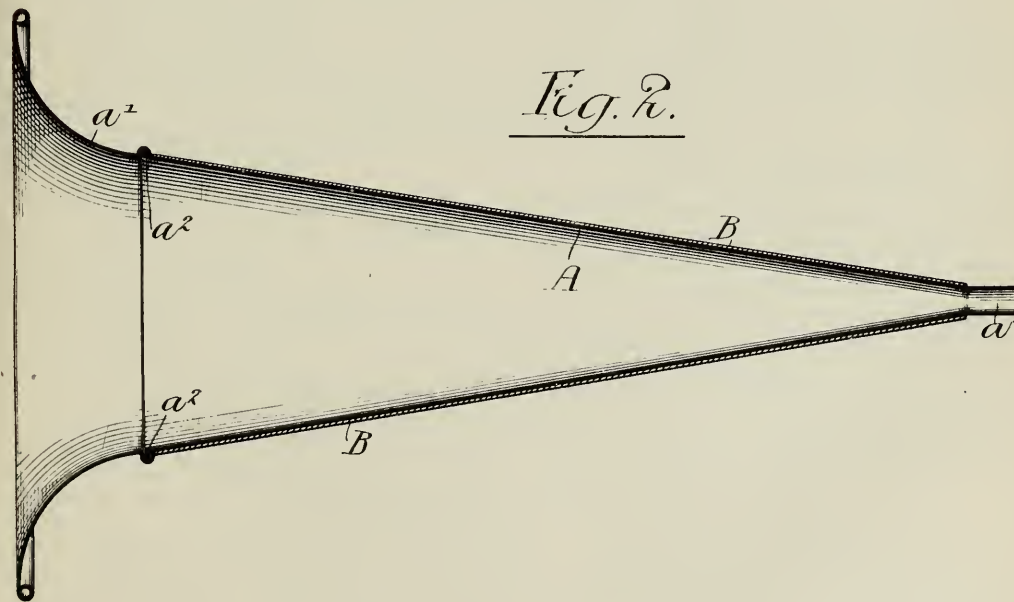
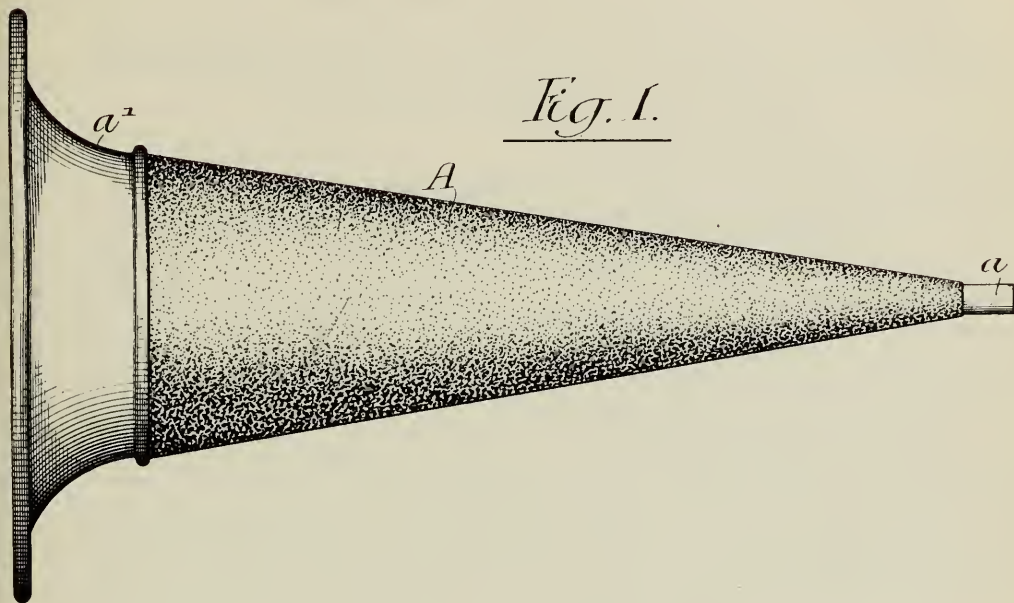
PATENTED MAY 10, 1904.

H. SHEBLE.

HORN FOR TALKING MACHINES.

APPLICATION FILED JULY 21, 1903.

NO MODEL.

Witnesses:-

Hamilton D. Turner

Wm. E. G. H. L.

Inventor:-  
Horace Sheble,  
by his Attorneys

Howson &amp; Howson





# UNITED STATES PATENT OFFICE.

HORACE SHEBLE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
HAWTHORNE & SHEBLE MANUFACTURING COMPANY, OF PHILA-  
DELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## HORN FOR TALKING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 759,639, dated May 10, 1904.

Application filed July 21, 1903. Serial No. 166,449. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE SHEBLE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Horns for Talking-Machines, of which the following is a specification.

My invention consists of an improvement in the construction of horns primarily designed to be connected to the conduit leading from the vibrating diaphragm or sound-box of a talking-machine of any of the well-known forms, the object of the invention being to provide means for damping or preventing the vibrations of the metal of which the horn is composed, which heretofore have ordinarily interfered with the vibration of the column of air within the horn, so as to give a more or less objectionable quality to the music or other sounds reproduced by the machine to which the horn is attached.

A further object of the invention is to provide means whereby the appearance of a horn of the character above noted may be greatly enhanced, said means being of such a nature as to be durable.

These objects I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a horn for use in connection with a talking-machine, being illustrated as provided with a covering according to my invention. Fig. 2 is a sectional elevation of the horn shown in Fig. 1, showing the detail construction of the same.

In horns for the purpose noted it has hitherto been customary to construct them of either polished brass or bronze throughout their entire length or to simply have them polished at their mouth or bell, while covering with black japan or other similar material the body or conical portion. To those accustomed to the use of machines for reproducing sound it is well known that hitherto there has always been present an objectionable metallic note produced by the machine when in operation, due in a great measure to the fact that the

vibrating column of air within the horn sets in vibration the metal of the horn itself, which in turn causes vibrations of air, so as to give rise to the objectionable note or tone mentioned. I have found, however, that by covering the body or conical portion of the horn with a layer of cloth, preferably adherent to the horn, the quality of the sound reproductions is greatly improved and that with the entire absence of the objectionable metallic sound heretofore always present.

In the above-mentioned drawings, A is the body or conical portion of a horn formed of metal, as is usually the case, and having at its smaller end a cylindrical nozzle *a* for attachment to the tube connected to the sound-box containing the vibrating diaphragm of the talking-machine.

*a'* is the bell or mouth of the horn and is held, as customary, to the large end of the body portion A by means of a turned-over edge in engagement with a flange *a''* on said body portion.

B is a layer of cloth preferably extending over the entire surface of the body portion A and being held thereon by glue, varnish, or any other desired material. Not only does this coating of cloth dampen the vibrations of the metal horn, and thereby improve the quality of the sounds reproduced by the machine, but it gives a finished appearance to the body portion of said horn and is itself of such a nature as not to be easily injured or disfigured. This is quite an important feature, as the japan or varnish hitherto used is very easily scratched, with consequent injury to the appearance of the horn.

I claim as my invention—

1. As a new article of manufacture, a horn for talking-machines, the same having a substantially conical body portion of relatively stiff sheet metal and having a covering of woven fabric upon said body portion, said fabric being permanently retained in intimate contact with the body, substantially as described.

2. As a new article of manufacture, a horn for a talking-machine, the same including a conical body portion and a mouthpiece therefor, said parts being of relatively stiff sheet metal with a covering of cloth glued to the said body portion of the horn, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HORACE SHEBLE.

Witnesses:

CHAS. SULZNER,  
MARIE E. DONIGAN.

[Endorsed]: United States District Court, Northern District of California, Second Division. Searchlight Horn Company, Complainant, against Pacific Phonograph Company, Defendant. Searchlight Horn Company, Complainant, against Babson Brothers, Inc., Defendant. Complainant's Exhibit Sheble Patent No. 759,139. Jessie B. Kay, Notary Public.

Filed Aug. 24, 1914. W. B. Maling, Clerk.

No. Eq. 18. U. S. Dist. Court, Nor. Dist. of Cal. Pltffs. Exhibit 26. Filed Nov. 17, 1915. W. B. Maling, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 26. Filed Apr. 8, 1916. F. D. Monckton, Clerk.





**Defendants' Exhibit "S."**

2—390.

UNITED STATES OF AMERICA,  
DEPARTMENT OF THE INTERIOR.  
UNITED STATES PATENT OFFICE.

To all to whom these presents shall come, Greeting:

THIS IS TO CERTIFY that the annexed is a true  
copy from the Records of this Office of the File  
Wrapper and Contents in the matter of the

Letters Patent of

Peter C. Nielsen,

Number 771,441,                      Granted October 4, 1904,

for

Improvement in Horns for Phonographs or Similar  
Machines.

IN TESTIMONY WHEREOF I have hereunto  
set my hand and caused the seal of the Patent Office  
to be affixed at the City of Washington, this 29th  
day of May, in the year of our Lord one thousand  
nine hundred and eleven and of the Independence of  
the United States of America the one hundred and  
thirty-fifth.

F. A. TENNANT,  
Assistant Commissioner of Patents.

2—437.

NUMBER (SERIES OF 1900). 1904      DIV. 23  
203,080      (EX'R'S BOOK). 114

9 (04)

## PATENT No. 771,441.

Name—Peter C. Nielsen

of Greenpoint.

County of

State of New York.

Invention—Horn for Phonographs and Similar  
Machines.

## ORIGINAL.

## RENEWED.

Division of App., No. , filed , 190  
PARTS OF APPLICATION FILED.

Petition	Apr. 14, 1904	, 190
Affidavit	“ “, 1904	, 190
Specification	“ “, 1904	, 190
Drawing	“ “, 1904	, 190
Model or Specimen Not reqd.,	190	, 190
First Fee Cash \$15.00	Apr. 14, 1904	, 190
“ “ Cert.	, 190	, 190
Appl. filed complete	Apr. 14, 1904	, 190

Examined—J. T. Newton, Ex. Sept. 2, 1904 , 190

Countersigned—R. E. Grant, , 190

For Commissioner. For Commissioner.

Notice of Allowance Sept. 3, 1904 , 190

Final Fee Cash \$20 Sept. 12, 1904 , 190

“ “ Cert. , 190 , 190

Patented October 4 , 1904

Attorney EDGAR TATE & CO.,

245 Broadway,

New York City.

Associate Attorney—WM. N. CROMWELL,  
1003 F. St., N. W.,  
City.

Name	Serial Number
Patent No.	Date of Patent

3

No. 203080	No. 1/2
	filed
	Apl 14/04

\$15—RECEIVED

APR. 14, 1904. ck.

CHIEF CLERK, U. S. PATENT OFFICE.

245 Broadway, New York.

April 13, 1904.

Hon. Commissioner of Patents,  
Washington, D. C.

Sir:—

We beg to enclose herewith application of Peter C. Nielsen for Letters Patent for Horns for Phonographs and Similar Machines, together with check for \$15, the Government filing fee thereon.

Very respectfully,

EDGAR TATE & CO.

APPLICATION FOR LETTERS PATENT  
OF THE UNITED STATES.

MAIL ROOM	No. 203080	No. 1/2.
APR. 14, 1904		Appl'n filed
U. S. PATENT OFFICE.		Apl. 14/04.

PETITION.

To the Commissioner of Patents:

Your petitioner, PETER C. NIELSEN, a citizen of the United States and residing at Greenpoint in

the County of Kings and State of New York and having a post-office address at 23 Drake Ave., Greenpoint, Brooklyn, N. Y., prays that Letters Patent may be granted to him for the improvements in HORNS FOR PHONOGRAPHS AND SIMILAR MACHINES set forth in the annexed specification; and he hereby appoints Edgar Tate and William W. Canfield of the firm of EDGAR TATE & CO., 245 Broadway, New York, or their accredited agent to act as his attorneys to prosecute this application, with power to make alterations and amendments therein, to sign the drawings, to receive the patent, and to transact all business in the Patent Office connected therewith.

PETER C. NIELSEN.

SPECIFICATION.

To all whom it may Concern:

Be it known that I, PETER C. NIELSEN, a citizen of the United States residing at Greenpoint in the County of Kings and State of New York, have invented certain new and useful improvements in HORNS FOR PHONOGRAPHS OR SIMILAR MACHINES of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to the horn of a phonograph or other machine of this class and the object thereof is to provide a horn for machines of this class which will do away with the mechanical, vibratory, and metallic sound usually produced in the operation such machines, and also produce a full, even and con-

tinuous volume of sound in which the articulation is clear, full and distinct.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Fig. 1 is a side view of my improved phonograph horn;

Fig. 2 an end view thereof;

Fig. 3 an enlarged section on the line 3-3 of Fig. 1; and

Fig. 4 a longitudinal section on the line 4-4 of Fig. 3.

In the practice of my invention, I provide a horn *a* provided at its smaller end with the usual nozzle piece *a2* by means of which connection is made with the machine, and in the form of construction shown a supplemental piece *a3* is employed between the larger or body portion of the horn and the nozzle piece *a2*, but the parts *a3* and *a2* may be formed integrally if desired, and may be constructed in any desired manner.

The main part *a* of the horn is bell-shaped in form and tapers outwardly gradually from the part *a3* to the large or mouth end *a4*, and this curve or taper is greater or more abrupt adjacent to said larger or mouth end.

The body portion of the horn is also composed of a plurality of longitudinal strips *b* which are gradually tapered from one end to the other and which are connected longitudinally so as to form longitudi-



nal ribs *b2*, each of the strips *b* being provided at its opposite edges with a flange *b3*, and these flanges, of the separate strips *b*, are connected to form the ribs *b2*.

The body portion of the horn, or the strips *b* are composed of sheet metal, and it will be observed that the inner wall of the body portion of said horn in cross section is made up of a plurality of short lines forming, substantially, a circle, and it is the construction of the body portion of the horn as hereinbefore described, that gives thereto the qualities which it is the objects of this invention to produce, which objects are the result of the formation of the horn, or the body portion thereof of longitudinal strips *b*, and providing the outer surface thereof with the longitudinal ribs *b2*, and curving the body portion of the horn in the manner described.

If desired, the part *a3* may be formed integrally with the body portion of the horn, in which event the ribs *b2* would extend to the nozzle or connecting portion *a2*, and it is the longitudinal ribs *b2* which contribute mostly to the successful operation of the horn, said rib serving to do away with the vibratory character of horns of this class as usually made and doing away with the metallic sound produced in the operation thereof.

My improved horn may be used in connection with phonographs, or other machines of this class, and changes in and modifications of the construction described may be made without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim

as new and desire to secure by Letters Patent, is:—

1. A horn for phonographs and similar machines, the body portion of which is composed of longitudinally arranged strips of metal provided at their edges with longitudinal outwardly directed flanges whereby said strips are connected and whereby, the body portion of the horn is provided on the outside thereof with longitudinally arranged ribs, substantially as shown and described.

2. A horn for phonographs and similar machines, the body portion of which is composed of longitudinally arranged strips of metal provided at their edges with longitudinal outwardly directed flanges whereby said strips are connected and whereby the body portion of the horn is provided on the outside thereof with longitudinally arranged ribs, said strips being tapered from one end of said horn to the other, substantially as shown and described.

---

8/25/04      3. ~~A horn for phonographs and similar machines, said horn being tapered in the usual manner and the body thereof on the outer side thereof being provided with longitudinally arranged ribs, substantially as shown and described.~~

Insert A

---

IN TESTIMONY that I claim the foregoing as my invention I have signed my name in the presence of the subscribing witnesses this 13th day of April, 1904.

PETER C. NIELSEN.

Witnesses:

F. A. STEWART,  
C. J. KLEIN.

## OATH.

STATE OF NEW YORK,  
COUNTY OF NEW YORK,—ss.

PETER C. NIELSEN, the above named petitioner, being duly sworn, deposes and says that he is a citizen of the United States and resident of Greenpoint in the County of Kings and State of New York; that he verily believes himself to be the original, first and sole inventor of the improvements in HORNS FOR PHONOGRAPHS AND SIMILAR MACHINES described and claimed in the annexed specification; that he does not know and does not believe that the same was ever known or used prior to his invention thereof, or patented or described in any printed publication in the United States of America or any country foreign thereto before his invention thereof, or more than two years prior to this application, or in public use or on sale in the United States for more than two year prior to this application; and that no application for a patent has been filed by him or his legal representatives or assigns in any country foreign to the United States.

PETER C. NIELSEN.

Sworn to and subscribed before me this 13th day of April, 1904.

[Notarial Seal]

W. W. CANFIELD,  
Notary Public.

2—260

Div. 23—Room 379

Address only

“The Commissioner of Patents,  
Washington, D. C.”

Paper No. 1, Rejection

All communications respecting this  
application should give the serial num-  
ber, date of filing, and title of in-  
vention.

J. H. D.

DEPARTMENT OF THE INTERIOR.  
UNITED STATES PATENT OFFICE.

WASHINGTON, D. C. May 13, 1904.

MAILED “ “ “

Peter C. Nielsen,  
Care Edgar Tate & Co.,  
#245 Broadway,  
New York, N. Y.

Please find below a communication from the  
EXAMINER in charge of your application for  
Horn for Phonographs & Similar Machines, filed  
April 14, 1904, Serial number 203,080.

F. I. ALLEN,

~~E. B. MOORE,~~

Commissioner of Patents.

Claim 3 of this application is rejected in view of  
Tourtels Eng. Pat. #20,557 of 1902, Graphophones,  
and U. S. Patent of Fallows, Aug. 15, 1876, #181,159,  
Games and Toys, Toys, Sounding, it being held that  
it would not constitute patentable invention to pro-  
vide a horn with longitudinal ribs, in view of the  
transverse ribs of Fallow's and the longitudinal rib  
of Tourtel.

J. T. NEWTON,

Ex.

J. H. L.

No. 2

Amdt. A

C.....6/7/04

MAIL ROOM

JUN. 7, 1904.

U. S. PATENT OFFICE.

IN THE UNITED STATES PATENT OFFICE.

ROOM #379.

In re Application of PETER C. NIELSEN, Horn  
for Phonographs and Similar Machines, Filed  
April 14, 1904. Ser. #203,080.

To the Commissioner of Patents,

Sir: We desire to amend the above entitled case  
as follows:

---

Add the following claim.

8/26/04      4.    A horn for phonographs and similar machines, said horn  
being tapered in the usual manner and the body thereof on the  
A    outer side thereof being provided with longitudinally arranged  
ribs between which the longitudinal parts of the horn taper  
from one end to the other, substantially as shown and described.

---

Insert B

## REMARKS.

This amendment is made in view of the Official communication of May 13. The references cited in this case do not show a horn for talking machines having longitudinally arranged ribs on the outer side thereof. One of the references cited shows spirally arranged ribs, but this in no sense anticipates applicant's invention. This arrangement of



the ribs would make the horn vibrate more and cause more of a metallic sound than if no ribs at all were formed on it. It is the longitudinally arranged ribs on the outer side of the horn which produce the result claimed by applicant, and favorable action is respectively requested.

Respectfully submitted,

EDGAR TATE & CO.

Attorney for Applicant.

Dated New York, June 6, 1904.

2—260

Div. 23—Room 379

Paper No. 3, Rej.

Address only

"The Commissioner of Patents,  
Washington, D. C."

All communications respecting this  
application should give the serial number,  
date of filing, and title of invention.

J.H.D.

DEPARTMENT OF THE INTERIOR.

UNITED STATES PATENT OFFICE

WASHINGTON, D. C., June 22, 1904.

MAILED

“ “ “

Peter C. Nielsen,  
Care Edgar Tate & Co.,  
#245 Broadway,  
New York, N. Y.

Please find below a communication from the Examiner in charge of your application for Horn for Phonographs and Similar Machines, filed April 14, 1904, serial number 203,080.

F. I. ALLEN,

~~E. B. MOORE,~~

Commissioner of Patents.

This action is in response to the amendment filed the 7th instant.

Claims 3 and 4 are rejected in view of the patent of Clayton, Oct. 18, 1898, #612,639, (181-25), the part "A" in said patent being considered the equivalent of applicant's horn as defined in claims 3 and 4 though said part "A" be more flaring than applicant's horn.

J. T. NEWTON,  
Ex.

J. H. L.  
MAIL ROOM No. 4.  
JUN. 22, 1904. Amdt. B  
U. S. PATENT OFFICE. 6/22/04  
IN THE UNITED STATES PATENT OFFICE,  
ROOM 379.

In the Matter of the Application of PETER C. NIELSEN,

Horn for Phonographs and Similar Machines.

Filed April 14, 1904, Ser. No. 203080.

Hon. Commissioner of Patents,  
Washington, D. C.

Sir: We desire to amend the above-entitled case as follows:—

Add the following claim:—

5. A horn for phonographic and similar instruments, said horn being larger at one end than at the other and being composed of longitudinal tapered strips which are secured together at their edges, substantially as shown and described.

Insert C

REMARKS.

This amendment is supplemental to that dated June 6th, 1904, and it is respectfully requested that said amendment be entered and the case considered in view thereof.

Respectfully submitted,  
EDGAR TATE & CO.,  
Attorneys for Applicant.

Dated New York, June 21, 1904.

MAIL ROOM

JUN. 29, 1904.

U. S. PATENT OFFICE.

IN THE UNITED STATES PATENT OFFICE,  
ROOM #379.

No. 5

Amdt. C. K.

6/29/04

In re Application of PETER C. NIELSEN, Horn  
for Phonographs and Similar Instruments.

Filed April 14, 1904. Ser. No. 203,080.

To the Commissioner of Patents,

Sir: We desire to amend the above-entitled case as follows:

Add the following claim:

---

3 6. A horn for phonographs and similar instruments, said horn being larger at one end than at the other and tapered in the usual manner, said horn being composed of longitudinally arranged strips secured together at their edges and the outer side thereof at the points where said strips are secured together being provided with longitudinal ribs, substantially as shown and described.

---

## REMARKS.

This amendment is made in view of the Official communication of June 22d. We have carefully considered Clayton the new reference cited and we do not see any similarity therein to applicant's device either in construction or operation. The object of applicant's construction is to destroy the vibratory character of a phonographic horn, and this cannot be done by corrugating the horn as all forms of corrugations increase the vibration instead of diminishing it. This fact ought to be apparent on its face and there is nothing in the references that meet claims 3 and 4 and favorable action thereon as well as on claims 6 presented herewith is requested.

Respectfully submitted,

EDGAR TATE & CO.,

Attorneys for Applicant.

Dated New York, June 28, 1904.

2—260

Div. 23—Room 379

Address only

"The Commissioner of Patents,  
Washington, D. C."

Paper No. 6, Rej.

All communications respecting this  
application should give the serial num-  
ber, date of filing, and title of in-  
vention.

J. H. D.

DEPARTMENT OF THE INTERIOR,

UNITED STATES PATENT OFFICE,

WASHINGTON, D. C., July 21, 1904.

MAILED

“ “ “

Peter C. Nielsen,

Care Edgar Tate & Co.,

#245 Broadway,

New York, N. Y.

Please find below a communication from the Ex-

aminer in charge of your application for Horn for Phonographs and Similar Machines, filed April 14, 1904, serial number 203,080.

F. I. ALLEN,

~~E. B. MOORE,~~

Commissioner of Patents.

This action is in response to the amendments filed the 22d and 29th instants.

It is believed that it cannot constitute patentable invention to provide any horn with longitudinal stiffening ribs to render the horn perhaps less vibratory. Claims 3, 4 and 5 are held to be devoid of patentable novelty and invention in view of this holding and the prior art exhibited by the patents cited and the patent of Osten et al., July 22, 1902, #705,126, (181-27).

J. T. NEWTON,

Ex.

J. H. L.

Patented Aug. 14, '04.

MAIL ROOM

No. 7

JUL. 27, 1904.

Argument

U. S. PATENT OFFICE.

7/27/04

IN THE UNITED STATES PATENT OFFICE,  
ROOM 379.

In the Matter of the Application of PETER C.  
NIELSEN,

Horn for Phonographs and Similar Machines.

Filed April 14, 1904, Ser. No. 203,080.

Hon. Commissioner of Patents,  
Washington, D. C.

Sir: The Official communication of July 21st has



been received and considered. This communication states that "it is believed that it cannot constitute patentable invention to provide any horn with longitudinal stiffening ribs to render the horn perhaps less vibratory," and Claims 3, 4 and 5 are rejected. We do not understand what bearing if any this statement has on Claim 5 and an explanation is required before further amendment of the case.

Respectfully submitted,

EDGAR TATE & CO.,

Attorneys for Applicant.

Dated New York, July 26, 1904.

2—260

Div. 23—Room 379

Address only

"The Commissioner of Patents,  
Washington, D. C."

Paper No. 8.

All communications respecting this  
application should give the serial number,  
date of filing, and title of invention.

M. E. P.

DEPARTMENT OF THE INTERIOR,

UNITED STATES PATENT OFFICE,

WASHINGTON, D. C., August 5, 1904.

Mailed Aug. 5/04.

Peter C. Nielsen,

c/o Edgar Tate & Co.,

New York City.

Please find below a communication from the Examiner in charge of your application, Serial No. 203,080, filed April 14, 1904, for Horn for Phonographs and Similar Machines.

F. I. ALLEN,

E. B. MOORE,

Commissioner of Patents.

This action is responsive to letter filed the 27th ultimo.

Claims 3 and 4 are rejected in view of the holding that it cannot constitute patentable invention to provide any horn with longitudinal stiffening ribs to render the horn perhaps less vibratory. These claims and claim 5 are rejected also in view of the patents cited and the patent of Osten *et al* referred to in the last action.

J. T. NEWTON,  
Ex.

J. H. L.

U. S. PATENT OFFICE,  
RECEIVED  
AUG. 17, 1904,  
DIVISION 23.

No. 9.  
Asso-Power

IN THE UNITED STATES PATENT OFFICE,  
ROOM 379.

In the Matter of the Application of PETER C.  
NIELSEN, Horn for Phonographs and Similar  
Machines.

Filed April 14, 1904, Ser. No. 203,080.

Hon. Commissioner of Patents,  
Washington, D. C.

Sir: We hereby appoint William N. Cromwell,  
1003 F. Street, N. W., Washington, D. C., our asso-  
ciate attorney in the above-entitled case.

Respectfully submitted,

EDGAR TATE & CO.,  
Attorneys for Applicant.

Dated New York, Aug. 16, 1904.

U. S. PATENT OFFICE,

No. 10

RECEIVED

.      Amdt.

AUG. 26, 1904.

DIVISION 23.

IN THE UNITED STATES PATENT OFFICE.

Before the Examiner, Room 379.

In re Application of PETER C. NIELSEN, Horn for  
Phonographs and Similar Machines.

Filed April 14, 1904, Serial No. 203,080.

Hon. Commissioner of Patents,

Sir: The above-entitled application is hereby  
amended as follows:

Cancel claims 3, 4 and 5.

REMARKS.

The above amendment places this case in condi-  
tion for allowance, and such action is respectfully  
requested at an early date.

Very respectfully,

W. N. CROMWELL,  
Associate Attorney.

A. R. Issue Division. 2—181. Serial No. 203,080

All communications should be addressed to

“The Commissioner of Patents,

Washington, D. C.”

DEPARTMENT OF THE INTERIOR,

U. S. PATENT OFFICE,

Washington, D. C., Sept. 3, 1904.

Peter C. Nielsen,

c/o W. N. Cromwell,

City.

Sir:—Your application for a patent for an improvement in Horn for Phonographs and Similar Machines, filed April 14, 1904, has been examined and ALLOWED.

The final fee, Twenty Dollars, must be paid, and the Letters Patent bear date as of a day not later than SIX MONTHS from the time of this present notice of allowance.

If the final fee is not paid within that period the patent will be withheld, and your only relief will be by a renewal of the application, with additional fees, under the provisions of Section 4897, Revised Statutes. The office aims to deliver patents upon the day of their date, and on which their term begins to run; but to do this properly applicants will be expected to pay their final fees at least TWENTY DAYS prior to the conclusion of the six months allowed them by law. The printing, photolithographing, and engrossing of the several patent parts, preparatory to final signing and sealing, will consume

the intervening time, and such work will not be done until after payment of the necessary fees.

When you send the final fee you will also send, **DISTINCTLY AND PLAINLY WRITTEN**, the name of the **INVENTOR** and **TITLE OF INVENTION** AS ABOVE GIVEN, **DATE OF ALLOWANCE** (which is the date of this circular), **DATE OF FILING**, and, if assigned, the **NAMES OF THE ASSIGNEES**.


If you desire to have the patent issue to **ASSIGNEES**, an assignment containing a **REQUEST** to that effect, together with the **FEE** for recording the same, must be filed in this Office on or before the date of payment of final fee.

After issue of the patent uncertified copies of the drawings and specifications may be purchased at the price of 5 cents each. The money should accompany the order. Postage stamps will not be received.


Respectfully,

F. I. ALLEN,

Commissioner of Patents.

 After allowance, and prior to payment of the final fee, applicants should carefully scrutinize the description to see that their statements and language are correct, as mistakes not incurred through the fault of the office, and not affording legal grounds for reissues, will not be corrected after the delivery of the letters patent to the patentee or his agent.

 IN REMITTING THE FINAL FEE GIVE THE SERIAL NUMBER AT THE HEAD OF THIS NOTICE.

 If payment is made by check or draft, the credit allowed is subject to the collection of the same.



\$20 RECEIVED

ck SEP. 12, 1904. z

CHIEF CLERK, U. S. PATENT OFFICE.

245 Broadway, New York,

Sept. 10, 1904.

Hon. Commissioner of Patents,

Washington, D. C.

Sir: We beg to enclose herewith our check for \$20 final Government fee in the matter of the application of Peter C. Nielsen Phonograph Horn, filed April 14, 1904, Ser. No. 203,080, Allowed Sept. 3, 1904, and beg to request that the patent be duly issued.

Very respectfully,

EDGAR TATE & CO.

C. E. R.

2-191 Serial No. 203,080.

ISSUE DIVISION.

All communications should be addressed to

"The Commission of Patents,  
Washington, D. C."

DEPARTMENT OF THE INTERIOR.

UNITED STATES PATENT OFFICE,

WASHINGTON, D. C., Sept. 12, 1904.

Peter C. Nielsen,

c/o Edgar Tate & Co.,

245 Broadway,

New York, N. Y.

Sir:

You are informed that the final fee of TWENTY DOLLARS has been received in your application for Improvement in

Horn for Phonographs and Similar Machines.

Very respectfully,

F. I. ALLEN.

~~E. B. MOORE,~~

Commissioner of Patents.

No. 771,441.

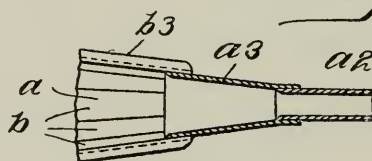
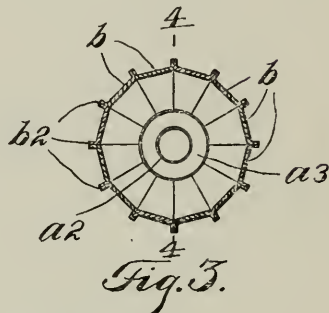
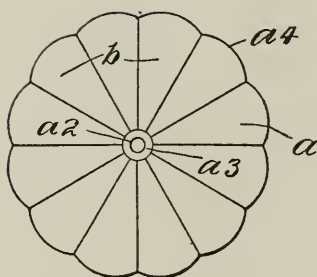
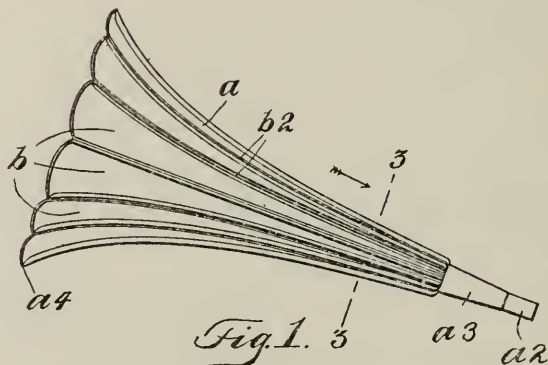
PATENTED OCT. 4, 1904.

P. C. NIELSEN.

HORN FOR PHONOGRAPHS OR SIMILAR MACHINES.

APPLICATION FILED APR. 14, 1904.

NO MODEL.



WITNESSES

Attestingly  
F. A. Stewart

Fig. 4. BY

INVENTOR

Peter C. Nielsen,  
Edgar & Co.

ATTORNEYS

## UNITED STATES PATENT OFFICE.

PETER C. NIELSEN, OF GREENPOINT, NEW YORK.  
HORN FOR PHONOGRAPHS OR SIMILAR MACHINES.

SPECIFICATION forming part of Letters Patent No. 771,441, dated October 4, 1904.

Application filed April 14, 1904. Serial No. 203,080. (No model.)

To all whom it may concern:

Be it known that I, PETER C. NIELSEN, a citizen of the United States, residing at Greenpoint, in the county of Kings and State of New York, have invented certain new and useful Improvements in Horns for Phonographs or Similar Machines, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to the horn of a phonograph or other machine of this class; and the object thereof is to provide a horn for machines of this class which will do away with the mechanical, vibratory, and metallic sound usually produced in the operation of such machines, and also produce a full, even, and continuous volume of sound in which the articulation is clear, full, and distinct.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which—

Figure 1 is a side view of my improved phonograph-horn; Fig. 2, an end view thereof; Fig. 3, an enlarged section on the line 3 3 of Fig. 1, and Fig. 4 a longitudinal section on the line 4 4 of Fig. 3.

In the practice of my invention I provide a horn *a*, provided at its smaller end with the usual nozzle-piece *a*<sup>2</sup>, by means of which connection is made with the machine, and in the form of construction shown a supplemental piece *a*<sup>3</sup> is employed between the larger or body portion of the horn and the nozzle-piece *a*<sup>2</sup>; but the parts *a*<sup>3</sup> and *a*<sup>2</sup> may be formed integrally, if desired, and may be construed in any desired manner. The main part *a* of the horn is bell-shaped in form and tapers outwardly gradually from the part *a*<sup>3</sup> to the larger or mouth end *a*<sup>4</sup>, and this curve or taper is greater or more abrupt adjacent to said larger or mouth end. The body portion of the horn is also composed of a plurality of longitudinal strips *b*, which are gradually tapered from one end to the other, and which are connected longitudinally, so as to form longitudinal ribs *b*<sup>2</sup>, each of the strips *b* being provided at

its opposite edges with a flange *b*<sup>3</sup>, and these flanges of the separate strips *b* are connected to form the ribs *b*<sup>2</sup>. The body portion of the horn or the strips *b* are composed of sheet metal, and it will be observed that the inner wall of the body portion of said horn in cross-section is made up of a plurality of short lines forming substantially a circle, and it is the construction of the body portion of the horn as hereinbefore described that gives thereto the qualities which it the objects of this invention to produce, which objects are the result of the formation of the horn or the body portion thereof of longitudinal strips *b* and providing the outer surface thereof with the longitudinal ribs *b*<sup>2</sup> and curving the body portion of the horn in the manner described. If desired, the part *a*<sup>3</sup> may be formed integrally with the body portion of the horn, in which event the ribs *b*<sup>2</sup> would extend to the nozzle or connecting portion *a*<sup>2</sup>, and it is the longitudinal ribs *b*<sup>2</sup> which contribute mostly to the successful operation of the horn, said ribs serving to do away with the vibratory character of horns of this class as usually made and doing away with the metallic sound produced in the operation thereof.

My improved horn may be used in connection with phonographs or other machines of this class, and changes in and modifications of the construction described may be made without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A horn for phonographs and similar machines, the body portion of which is composed of longitudinally-arranged strips of metal provided at their edges with longitudinal outwardly-directed flanges whereby said strips are connected and whereby, the body portion of the horn is provided on the outside thereof with longitudinally-arranged ribs, substantially as shown and described.

2. A horn for phonographs and similar machines, the body portion of which is composed of longitudinally-arranged strips of metal provided at their edges with longitudinal outwardly-directed flanges whereby said strips

771,441

2 are connected and whereby, the body portion  
of the horn is provided on the outside thereof  
with longitudinally-arranged ribs, said strips  
being tapered from one end of said horn to the  
5 other, substantially as shown and described.

3. A horn for phonographs and similar in-  
struments, said horn being larger at one end  
than at the other and tapered in the usual  
manner, said horn being composed of longi-  
10 tudinally-arranged strips secured together at  
their edges and the outer side thereof at the

points where said strips are secured together  
being provided with longitudinal ribs, sub-  
stantially as shown and described.

In testimony that I claim the foregoing as 15  
my invention I have signed my name, in pres-  
ence of the subscribing witnesses, this 13th  
day of April, 1904.

PETER C. NIELSEN.

Witnesses:

F. A. STEWART,  
C. J. KLEIN.

1904

CONTENTS:

[In pencil:] Acoustics—Megaphones.  
Print.

$\frac{1}{2}$  Application 1 paper.

1. Rej May 13/04.
2. Amdt. A. June 7/04.
3. Rej June 22/04.
4. Amdt. B. June 22/04.
5. Amdt. C. June 29/04.
6. Rej July 21/04.
7. Argument July 27/04.
8. Rej Aug 5/04.
9. Asso-Power Aug. 17/04.
10. Amdt. Aug. 26/04.
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- 20.
- 21.
- 22.
- 23.

TITLE:

Improvement in Horn for  
Phonographs or Similar Machines.

[Stamped.] U. S. Patent Office. Copy Made  
May 29, 1911.



[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cal. Dfts. Exhibit "S." Oct. 2/12, M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "S." Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "S." Filed Apr. 8, 1916. F. D. Monckton, Clerk.

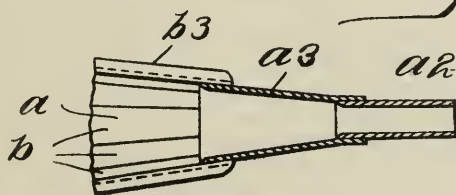
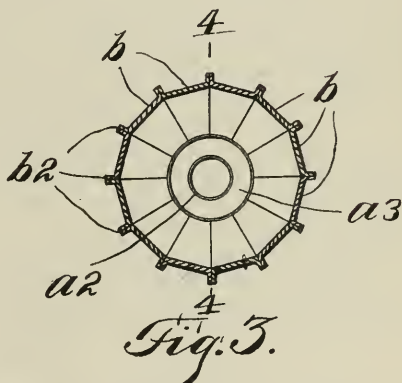
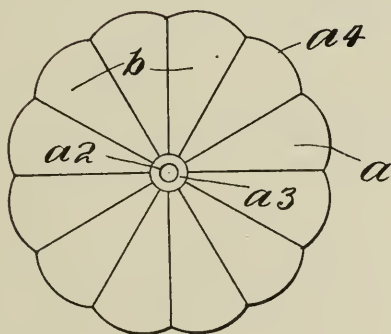
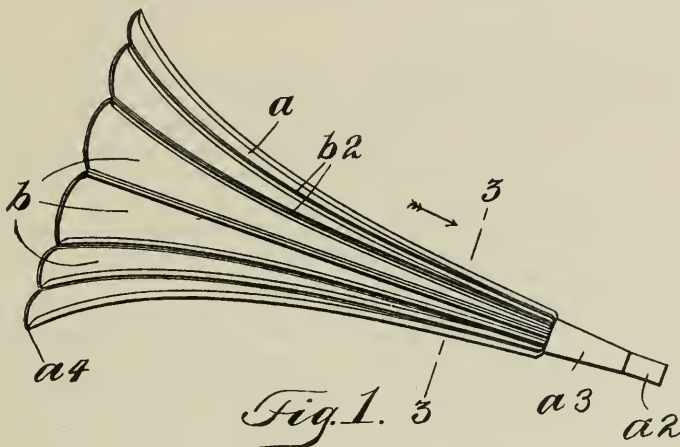
No. 771,441.

PATENTED OCT. 4, 1904.

P. C. NIELSEN.  
HORN FOR PHONOGRAPHS OR SIMILAR MACHINES.

APPLICATION FILED APR. 14, 1904.

NO MODEL.



WITNESSES

*Attest*  
*W. Mattingly*  
*F. A. Stewart*

*Fig. 4.*

INVENTOR  
Peter C. Nielsen,  
BY *Edgar R. Peters*  
ATTORNEYS



PETER C. NIELSEN, OF GREENPOINT, NEW YORK.

## HORN FOR PHONOGRAPHS OR SIMILAR MACHINES.

SPECIFICATION forming part of Letters Patent No. 771,441, dated October 4, 1904.

Application filed April 14, 1904. Serial No. 203,080. (No model.)

*To all whom it may concern:*

Be it known that I, PETER C. NIELSEN, a citizen of the United States, residing at Greenpoint, in the county of Kings and State of New York, have invented certain new and useful Improvements in Horns for Phonographs or Similar Machines, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to the horn of a phonograph or other machine of this class; and the object thereof is to provide a horn for machines of this class which will do away with the mechanical, vibratory, and metallic sound usually produced in the operation of such machines, and also produce a full, even, and continuous volume of sound in which the articulation is clear, full, and distinct.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which—

Figure 1 is a side view of my improved phonograph-horn; Fig. 2, an end view thereof; Fig. 3, an enlarged section on the line 3 3 of Fig. 1, and Fig. 4 a longitudinal section on the line 4 4 of Fig. 3.

In the practice of my invention I provide a horn *a*, provided at its smaller end with the usual nozzle-piece *a*<sup>2</sup>, by means of which connection is made with the machine, and in the form of construction shown a supplemental piece *a*<sup>3</sup> is employed between the larger or body portion of the horn and the nozzle-piece *a*<sup>2</sup>; but the parts *a*<sup>3</sup> and *a*<sup>2</sup> may be formed integrally, if desired, and may be constructed in any desired manner. The main part *a* of the horn is bell-shaped in form and tapers outwardly gradually from the part *a*<sup>3</sup> to the larger or mouth end *a*<sup>4</sup>, and this curve or taper is greater or more abrupt adjacent to said larger or mouth end. The body portion of the horn is also composed of a plurality of longitudinal strips *b*, which are gradually tapered from one end to the other, and which are connected longitudinally, so as to form longitudinal ribs *b*<sup>2</sup>, each of the strips *b* being provided at

its opposite edges with a flange *b*<sup>3</sup>, and these flanges of the separate strips *b* are connected to form the ribs *b*<sup>2</sup>. The body portion of the horn or the strips *b* are composed of sheet metal, and it will be observed that the inner wall of the body portion of said horn in cross-section is made up of a plurality of short lines forming substantially a circle, and it is the construction of the body portion of the horn as hereinbefore described that gives thereto the qualities which it is the objects of this invention to produce, which objects are the result of the formation of the horn or the body portion thereof of longitudinal strips *b* and providing the outer surface thereof with the longitudinal ribs *b*<sup>2</sup> and curving the body portion of the horn in the manner described. If desired, the part *a*<sup>3</sup> may be formed integrally with the body portion of the horn, in which event the ribs *b*<sup>2</sup> would extend to the nozzle or connecting portion *a*<sup>2</sup>, and it is the longitudinal ribs *b*<sup>2</sup> which contribute mostly to the successful operation of the horn, said ribs serving to do away with the vibratory character of horns of this class as usually made and doing away with the metallic sound produced in the operation thereof.

My improved horn may be used in connection with phonographs or other machines of this class, and changes in and modifications of the construction described may be made without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A horn for phonographs and similar machines, the body portion of which is composed of longitudinally-arranged strips of metal provided at their edges with longitudinal outwardly-directed flanges whereby said strips are connected and whereby, the body portion of the horn is provided on the outside thereof with longitudinally-arranged ribs, substantially as shown and described.

2. A horn for phonographs and similar machines, the body portion of which is composed of longitudinally-arranged strips of metal provided at their edges with longitudinal outwardly-directed flanges whereby said strips

re connected and whereby, the body portion of the horn is provided on the outside thereof with longitudinally-arranged ribs, said strips being tapered from one end of said horn to the other, substantially as shown and described.

3. A horn for phonographs and similar instruments, said horn being larger at one end than at the other and tapered in the usual manner, said horn being composed of longitudinally-arranged strips secured together at their edges and the outer side thereof at the

points where said strips are secured together being provided with longitudinal ribs, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 13th day of April, 1904.

PETER C. NIELSEN.

Witnesses:

F. A. STEWART,

C. J. KLEIN.



[Endorsed]: No. 18. U. S. Dist. Court, Nor. Dist. of Cal. Pltffs. Exhibit 3. Filed Nov. 17, 1915. W. B. Maling, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Plaintiff's Exhibit 3. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



C. J. EICHHORN.  
AMPLIFYING HORN.  
APPLICATION FILED JUNE 14, 1905.

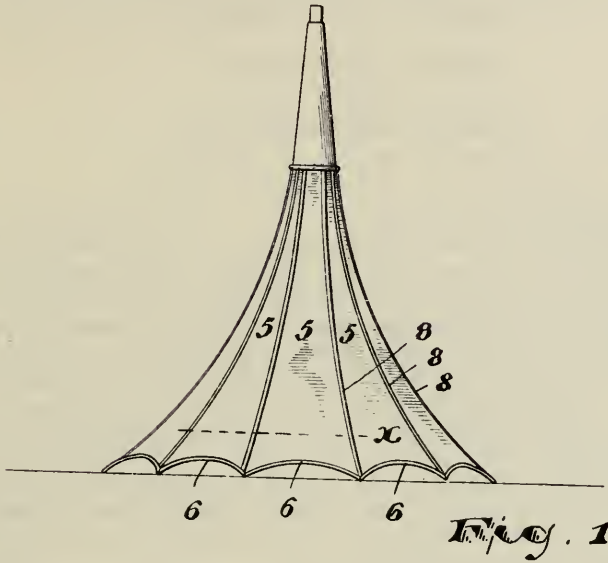


Fig. 2.

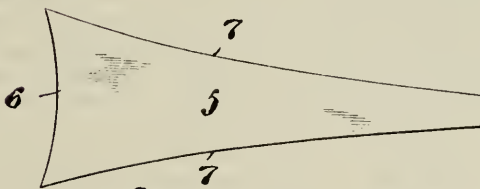
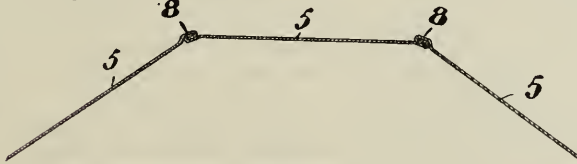


Fig. 3.



WITNESSES

Alfred Lancaster  
Russell M. Everett.

INVENTOR

Charles J. Eichhorn

BY

Charles H. Pell

ATTORNEY



# UNITED STATES PATENT OFFICE.

CHARLES J. EICHHORN, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE  
TEA TRAY COMPANY, OF NEWARK, NEW JERSEY.

## AMPLIFYING-HORN.

No. 797,725.

Specification of Letters Patent.

Patented Aug. 22, 1905.

Application filed June 14, 1905. Serial No. 265,291.

*To all whom it may concern:*

Be it known that I, CHARLES J. EICHHORN, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Amplifying-Horns; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

The objects of this invention are to secure greater strength and rigidity at the large end of the horn, more particularly in what are known as "flower-horns;" whereby said horns will be better able to maintain their flower shape while in transportation and in use.

Heretofore flower-shaped horns have had their projecting petals at the large end of the horn project beyond the termination of the ribs by which the sections of the horn have been held together. Thus the said petals, made from thin sheet material, were lacking in stiffness and were very easily bent, particularly when the horn stood upon its large end, as indicated in Figure 1 of the drawings, the bending and indenting of the weak petals greatly marring the appearance of the horn, so that it became unmarketable in the hands of the retail dealer. By my construction I secure a flower-shaped horn which is materially stronger to resist downward pressure.

Referring to the accompanying drawings, in which like numerals of reference indicate corresponding parts in each of the several figures, Fig. 1 is a side elevation of my improved horn, and Fig. 2 is a plan of one of the longitudinal sections thereof, and Fig. 3 is an enlarged section of the same taken at line *x*, Fig. 1.

In said drawings, 5 5 indicate the sections

of the horn, which individually are flaring in plan and at their large ends are made concave, as at 6. The longitudinal edges 7 of said sections are also concave, so that when said sections are joined together the horn will be given the desired flaring and regularly scalloped shape at the edge of the large end, resembling a flower.

The sections 5 5 are joined together at their longitudinal edges by doubling the overlapping edges to form thick longitudinal ribs 8 8 8, which extend to the points of greatest projection of the petals. Thus the ribs 8 8 come in contact with the ground while the center parts of the sections are raised from the ground, and so are protected from bending or indentation.

Having thus described the invention, what I claim as new is—

1. The improved horn herein described, comprising a series of longitudinal sections joined together at their longitudinal edges, said longitudinal edges being concaved in plan and the large end edges of said sections being also concave, the joints of the said horn projecting beyond the center portions of the ends of said sections.

2. The improved horn herein described comprising longitudinal sections joined together at their longitudinal edges, the said longitudinal edges overlapping and being doubled together to form ribs, and the said ribs extending, at the large end of the horn, beyond the centers of the ends of the said sections and being adapted to take the weight of the horn when the latter stands upon its large end.

In testimony that I claim the foregoing I have hereunto set my hand this 8th day of June, 1905.

CHARLES J. EICHHORN.

Witnesses:

CHARLES H. PELL,  
CLEMENT BEECROFT.





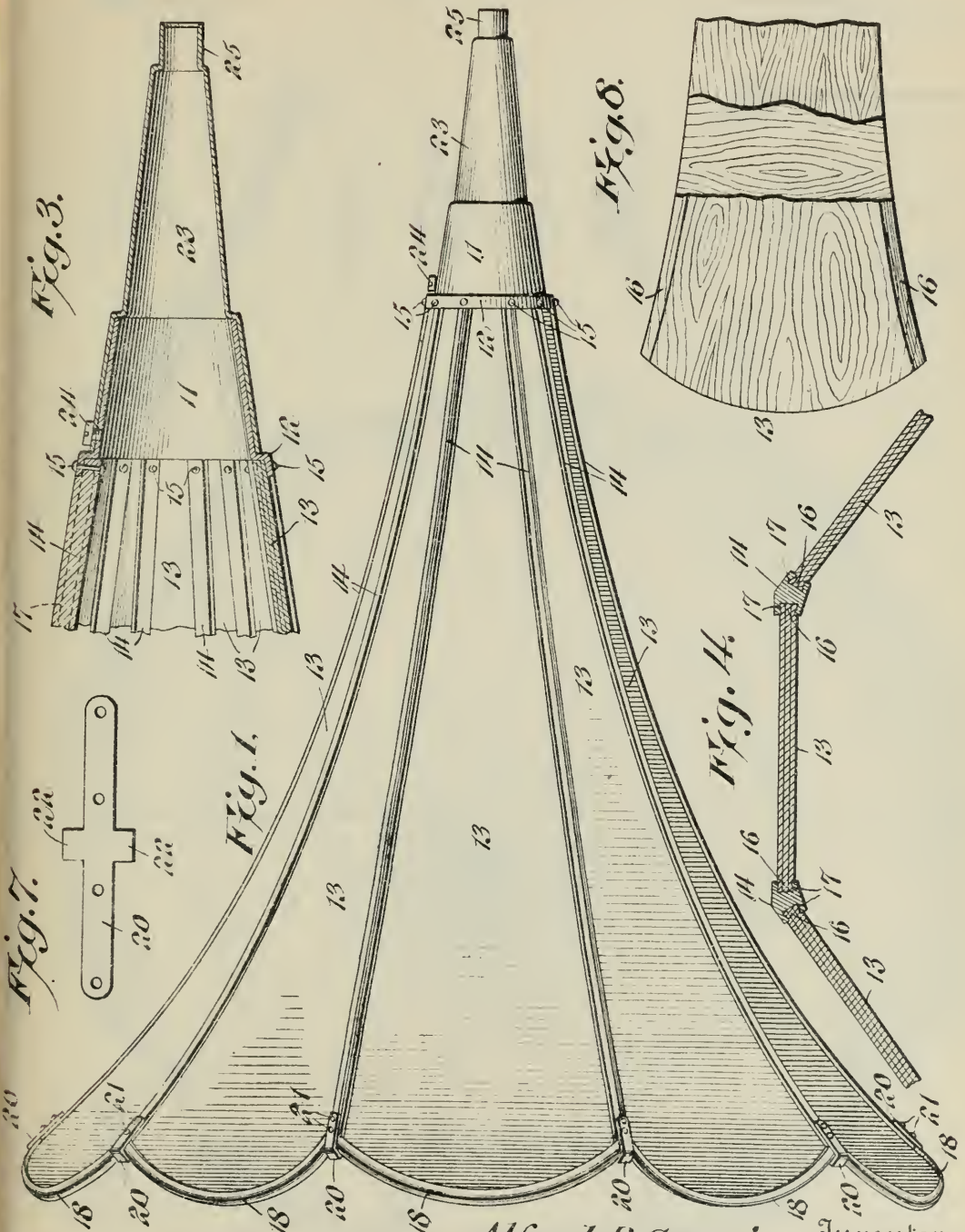
[Endorsed]: No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Exhibit 40. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



A. R. CUNNIUS.  
SOUND AUGMENTING HORN.  
APPLICATION FILED JAN. 6, 1908.

921,676.

Patented May 18, 1909.  
2 SHEETS—SHEET 1.



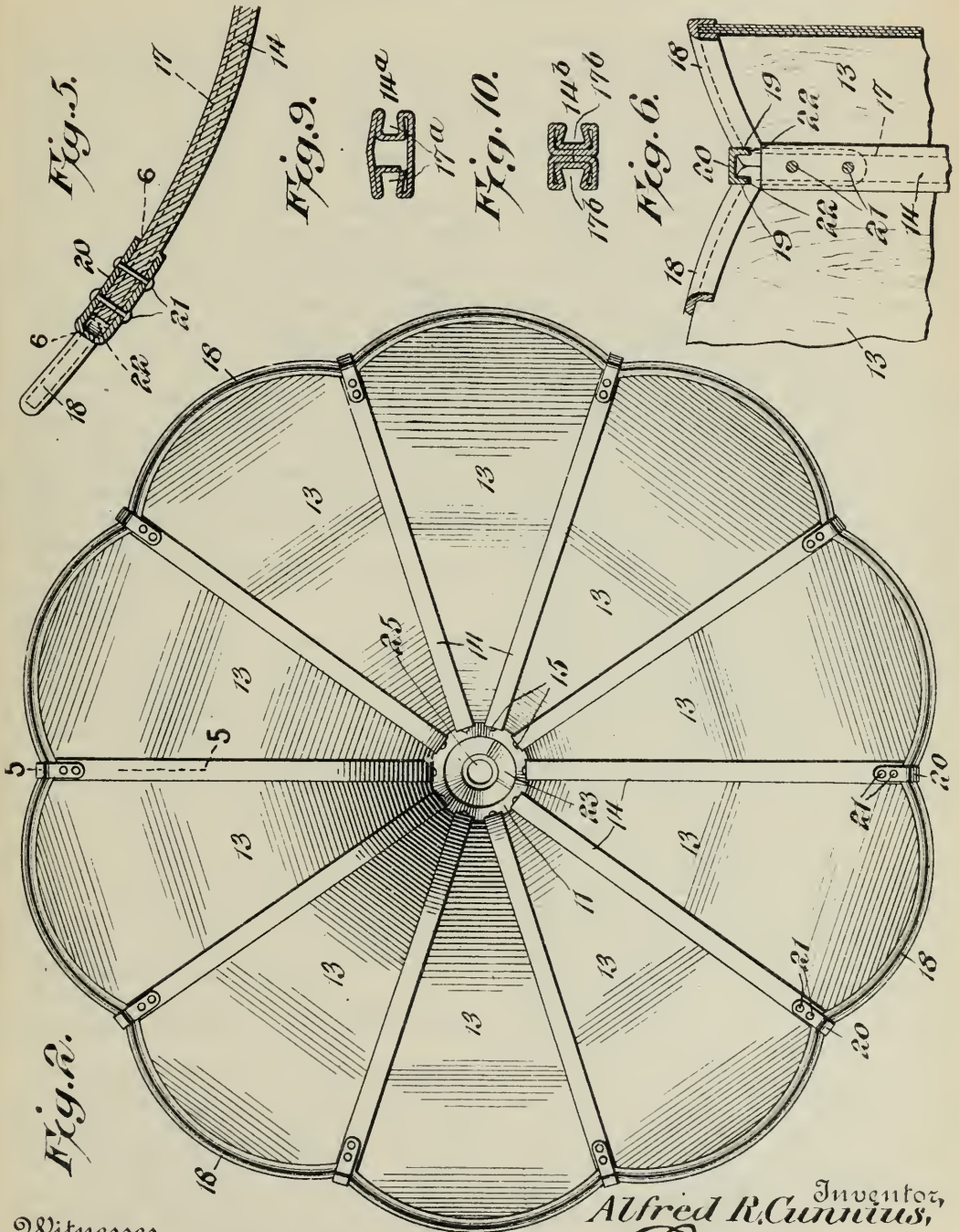
Witnesses  
Howard N. Ott.  
Alfred R. Cunnius, Inventor,  
By C. J. Siggers, Attorney





921,676.

Patented May 18, 1909.  
2 SHEETS—SHEET 2.



Witnesses  
Howard D. Carr.  
B. J. Fetter.

By

Inventor,  
Alfred R. Cunnius,  
C. J. Figger.

Attorney



ALFRED R. CUNNIUS, OF BROOKLYN, NEW YORK.

## SOUND-AUGMENTING HORN.

No. 921,676.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed January 6, 1908. Serial No. 409,567.

*To all whom it may concern:*

Be it known that I, ALFRED R. CUNNIUS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a new and useful Sound-Augmenting Horn, of which the following is a specification.

The principal object of the present invention is to provide a horn, particularly useful in connection with phonographs, graphophones and similar sound reproducing instruments, which is comparatively simple in construction, and is composed of sections made of wood or other suitable material that will eliminate to a very material degree, harshness of tone, imparting clearness and fullness of tone that is so much desired.

A further object is to provide a horn that is very ornamental in appearance, and can be highly finished, the parts being comparatively simple, and the different sections being held securely in place.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the horn, showing the reducer in place thereon. Fig. 2 is a front elevation of said horn. Fig. 3 is a detail longitudinal sectional view through the smaller end thereof. Fig. 4 is a detail cross sectional view therethrough. Fig. 5 is a detail longitudinal sectional view on the line 5—5 of Fig. 2. Fig. 6 is a sectional view on the line 6—6 of Fig. 5. Fig. 7 is a detail view of one of the clip blanks. Fig. 8 is a detail view of a portion of one of the horn sections, the parts being broken away to illustrate the arrangement of the veneers. Figs. 9 and 10 are cross sectional views illustrating modifications of the tie strips.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

The smaller end of the horn comprises a metallic tapered cuff 11 provided at its larger end with an annular enlargement 12, forming an external annular shoulder. The body of the horn comprises a plurality of tapered sections 13, longitudinally curved and flat in cross section, said sections being preferably constructed of a plurality of layers of wood veneer glued together and having the grain crossed or disposed in angular relation, as illustrated in Fig. 8. The inner and smaller ends of the sections are located in the enlargement 12. Tie strips 14 are located be-

tween the adjacent edges of the various sections and have their inner ends located in the enlargement 12, and secured thereto by rivets or other suitable fasteners 15. The opposite longitudinal margins of the sections 13 are provided with continuous longitudinal dovetails 16 and the tie strips 14 have continuous dovetail grooves 17 in their opposite sides that are angularly disposed and receive said sections. It will be noted that the channels forming the dovetails are cut solely in the outside layers and do not extend completely through the same.

The outer end edges of the sections 13 are inclosed by metallic binding strips 18. These strips are abutted at their ends against one another and against the outer ends of the tie strips 14, as will be evident by reference to Fig. 6. They are furthermore provided adjacent to their ends and in their outer sides with sockets 19. The various abutting ends are secured together by substantially U-shaped clips 20 that embrace the ends as shown in Figs. 5 and 6, and are secured to the tie strips by rivets 21 or other suitable fasteners. These clips are provided at their outer ends with inwardly extending tongues 22 which tongues engage in the sockets 19. As a result, the clips interlock with the binding strips, preventing their separation and said clips engaging over the ends of the binding strips, serve to prevent their movement away from the tie strips and cover the joints between the parts.

For certain instruments of a well known type, the cuff 11 is slipped into the end of the reproducer tube, but for other types of machines, a reducing sleeve 23 is employed, the outer end of which is enlarged and snugly receives the cuff 11, being abutted against the external shoulder thereof and detachably fastened thereto by a screw 24, which screw may also be employed for securing the cuff 11 in place on the instrument, when the sleeve is not in use. This sleeve is provided at its inner end with a contracted tubular nipple 25 on which the end of the sound conveyor tube may be placed as will be evident, said nipple forming an annular internal shoulder that abuts against the end of the cuff.

This structure as will be evident is comparatively simple, being angular in cross section, as shown in Fig. 4 and the sections are effectively held together so that there is little chance of their becoming separated.



Thus the dovetail connection between the sections and the tie strips insures a rigid and practically inseparable engagement between the parts and the binding strips are securely held together and to the tie strips. In this construction, moreover, the sections can be finished and highly polished, before they are assembled, and therefore made to match in color and material the case of the instrument with which it is used. Inasmuch as the dovetail forming channels are located solely in the outside layers, said layers will be clamped by the tie strips. By having the detachable reducer shown, said horn can be readily used in coaction with both of the two general types of sound reproducing machines now known.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention. For instance, in Fig. 9 there is illustrated a modified form of tie strip, designated 14<sup>a</sup>, this tie strip being constructed of sheet metal bent to produce the opposite sides and longitudinal dovetail grooves 17<sup>a</sup> in its opposite edges.

Another embodiment of this invention is shown in Fig. 10. In this form of construction the tie strip 14<sup>b</sup> is constructed of two pieces of sheet metal that are doubled and substantially U-shaped in cross section, forming the opposite longitudinally disposed dovetail 17<sup>b</sup>. The abutting rear faces of the sections are soldered or otherwise secured together.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. A sound augmenting horn, comprising a tapered cuff having an annular external shoulder between its ends, a horn body secured to the cuff, a tapered reducing sleeve that detachably fits upon the cuff and has one end abutting against the shoulder, said sleeve having an internal shoulder that abuts against the end of the cuff, and means for detachably securing the sleeve to the cuff.

2. A sound augmenting horn angular in cross section and comprising tapered sections, each section being longitudinally curved and transversely flat and each having its opposite side margins formed into continuous longitudinal dovetails, and tie strips located between the sections, each strip having longitudinal dovetailed sockets in its opposite sides that are angularly disposed with relation to each other and receive the adjacent dovetailed margins of the adjacent sections.

3. A sound augmenting horn, comprising sections, binding elements engaging the ends of the sections, and holding elements connecting the binding elements and having portions interlocked therewith.

4. A sound augmenting horn, comprising sections, binding elements engaging the ends of the sections, and holding elements connecting the binding elements, one set of elements being provided with sockets, the other having tongues that engage in the sockets.

5. A sound augmenting horn, comprising sections, binding elements engaging the ends of the sections and having sockets in their end portions, and holding clips connecting the end portions of the binding elements and having tongues that engage in the sockets.

6. A sound augmenting horn, comprising sections, tie strips connecting the longitudinal margins of the sections, binding strips engaging the ends of the sections, and clips secured to the strips and having portions interlocked with the end portions of the binding strips.

7. A sound augmenting horn, comprising sections, tie strips located between and embracing the longitudinal margins of the sections, binding strips engaging the ends of the sections and having sockets in their end portions, and clips secured to the outer ends of the tie strips, and having spaced inwardly extending tongues that engage in the sockets of the binding strips.

8. A sound augmenting horn, comprising sections, each section consisting of a plurality of layers of veneer, tie strips located between the longitudinal margins of the sections and having dovetailed connections therewith, binding strips covering the outer ends of the section and having their end portions abutted and provided with sockets, and clips covering the outer ends of the tie strips and binding strips and secured to said tie strips, said clips having inwardly extending tongues that engage in the sockets of the binding strips.

9. A sound augmenting horn, comprising a tapered cuff, sections having their inner ends fitted into the cuff, tie strips located between and secured to the sections, said strips having their inner ends located in and secured to the cuff, a tapered reducing sleeve having its larger end detachably fitting upon the cuff, said sleeve being provided at its smaller end with a tubular nipple, and a screw for detachably securing the sleeve to the cuff.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ALFRED R. CUNNIUS.

Witnesses:

MICHAEL SCHREINER,  
THOS. F. WRIGHT.

[Endorsed]: No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Exhibit 47. Filed Apr. 8, 1916. F. D. Monckton, Clerk.

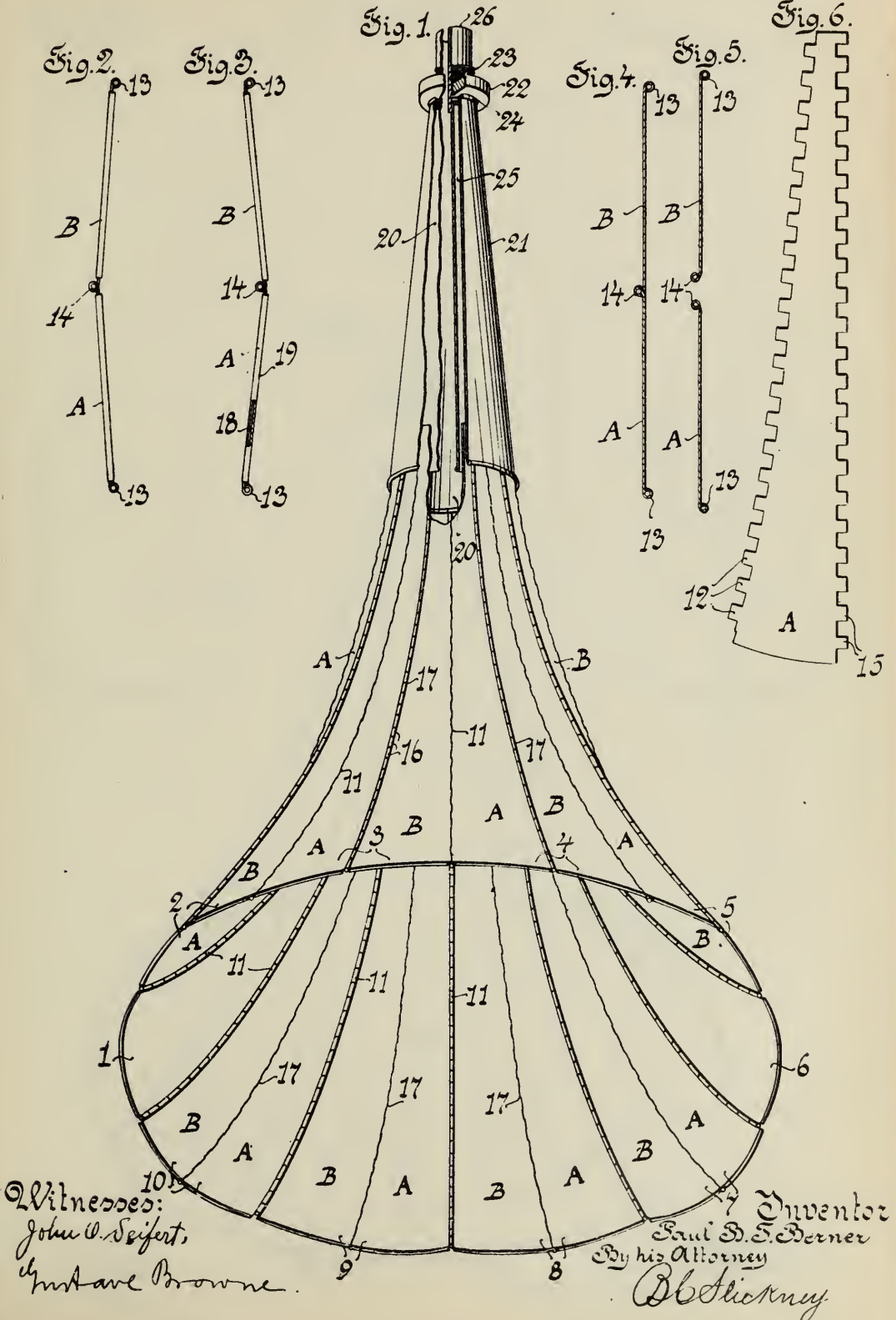




926,235.

Patented June 29, 1909.

3 SHEETS—SHEET 1.

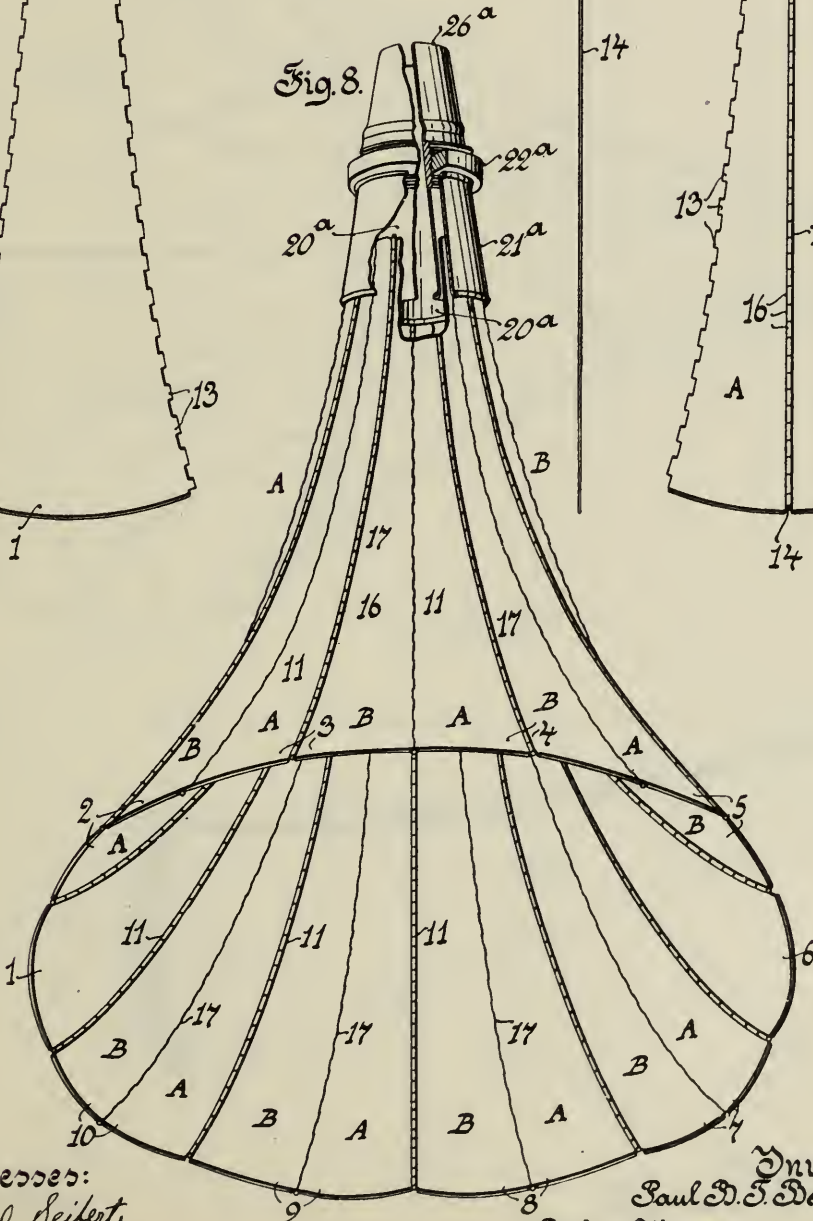
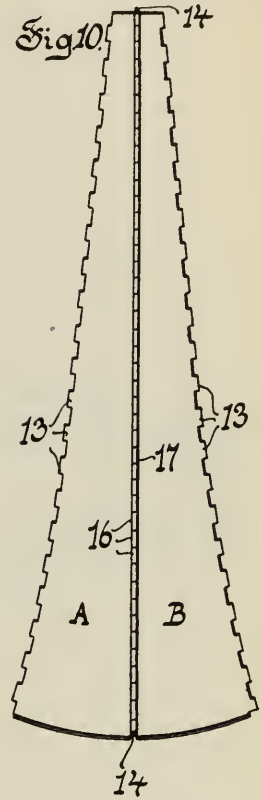
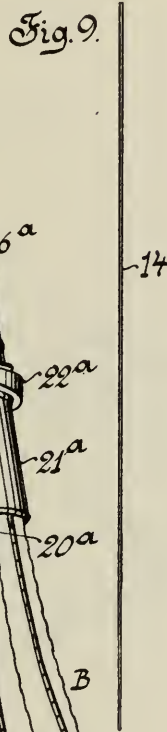
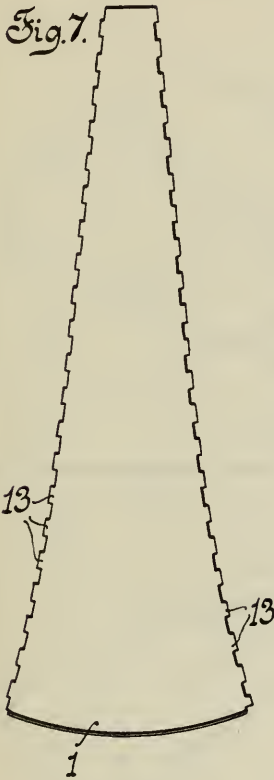


Witnesses:  
John W. Seifert,  
Arthur Browne.

Inventor  
Paul D. Berner  
By his Attorney  
O. B. Hickney



926,235.



Witnesses:  
 John C. Seifert.  
 Arthur Brown.

Inventor  
 Paul D. Berner  
 By his Attorney  
 R. C. Stickney

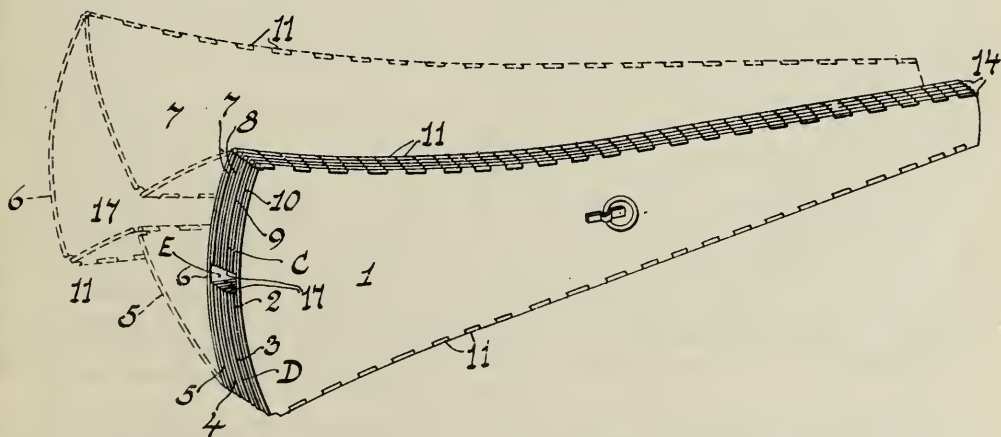
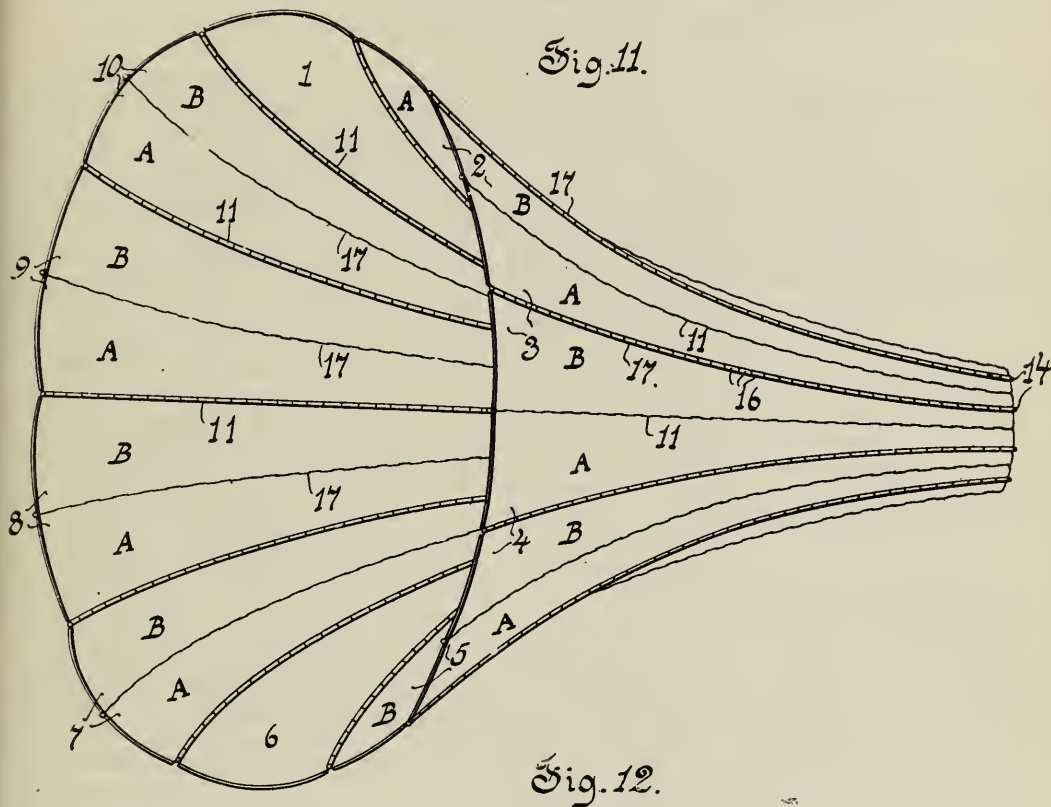




P. B. T. BERNER.  
PHONOGRAPH HORN.  
APPLICATION FILED AUG. 19, 1907.

926,235.

Patented June 29, 1909.  
3 SHEETS—SHEET 3.



Witnesses:  
John D. Seifert.  
Charles Brown.

Inventor  
Paul D. T. Berner  
By his Attorney  
R. H. Atter



# UNITED STATES PATENT OFFICE.

PAUL B. T. BERNER, OF NEW YORK, N. Y., ASSIGNOR TO SEARCHLIGHT HORN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## PHONOGRAPH-HORN.

No. 926,235.

Specification of Letters Patent.

Patented June 29, 1909.

Application filed August 19, 1907. Serial No. 389,188.

*to all whom it may concern:*

Be it known that I, PAUL B. T. BERNER, citizen of the United States, residing in the borough of Brooklyn, city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Phonograph-Horns, of which the following is a specification.

This invention relates to phonograph horns and like instruments, the bells of which are usually built up of a series of sections, the latter generally having curved side edges which give the desired contour to the bell; and in certain respects it is in the nature of an improvement on the horns shown in United States Patents 12,442 of January 30, 1906, and 771,441 of October 4, 1904.

One of the principal objects of my invention is to simplify the construction and reduce the cost of the built-up bell of a phonograph horn. To this end, I make the sections of thin flexible sheet metal, usually with curved side edges, and join said curved edges together by means of wires passing through a series of eyes rolled or formed alternately in the contiguous sections. This method of joining the strips together is very simple and inexpensive.

A further object of the invention is to produce a horn which is capable of being folded or reduced in bulk for convenience in transportation or storage.

In carrying out this feature of the invention, I preferably form certain or all of said sections of two strips each as hereinafter described. This permits the strips to fold together in the manner of the plaits of a fan, so that all the strips can pack facewise against each other, thereby reducing the bulk to a minimum. In setting up the horn it is only necessary to expand the bell, which, owing largely to the outward buckling of the large ends of the strips, possesses sufficient rigidity for use.

Preferably each of two sections in the horn is single, that is, formed of a single metal plate instead of being formed of two strips hinged together. These single plates or sections are placed opposite each other in the horn, so that when the same is folded, the strips or plaits form two sets which lie one

opposite the other between said single sections, so that the device very closely resembles a folded fan in form.

It will be understood that if the bell is not intended to be collapsible, all of the sections may be single instead of formed each of a pair of strips hinged together; the novel method of hinging the sections together even in a non-collapsible horn being preferable to methods heretofore in vogue.

The neck of the bell, whether collapsible or not, may be provided with any suitable funnel or means to connect the same to a phonograph as hereinafter described.

In the following I have described, in connection with the accompanying drawings, one form of device illustrating the carrying out of my invention.

In the accompanying drawings, Figure 1 is a view of a phonograph horn embodying my several improvements in one form; parts being broken away to disclose the invention more clearly. Figs. 2 and 3 are end views of a bell section, comprising two strips hinged together, and illustrates the buckling or springing of the strips when opening the bell. Fig. 4 is a sectional view to illustrate the hinging of the strips which form a bell section. Fig. 5 shows the Fig. 4 strips separated. Fig. 6 is a blank of one of the strips which make up the bell sections. Fig. 7 is one of the single or main sections of the bell, undivided into strips. Fig. 8 is a view of another construction of device for clamping the neck of a bell. Fig. 9 shows one of the wires which form the pintles to connect the strips and sections together. Fig. 10 is a view of two strips hinged together to form a section. Fig. 11 is a view of a detached opened bell. Fig. 12 shows the bell folded in full lines, and also, shows by dotted lines the manner of unfolding the same.

Similar letters and numerals of reference indicate similar parts throughout the several views.

The bell, which in this instance has the popular flower contour, is illustrated as made up of ten tapering flexible sheet metal sections, which have curved side edges to give the proper contour to the bell, and are



numbered from 1 to 10 inclusive. These sections are each permanently hinged to both adjoining sections, as at 11, said hinges 11 being on the inside of the horn and connecting said curved side edges. Along each of said side edges are originally stamped in each plate a succession of tongues 12, which are then bent, curled or rolled to form eyes 13, the eyes along one curved edge alternating with those along the contiguous curved edge and fitting therebetween, so that the eyes are all coincident or co-axial, as seen at 11, Fig. 1. Connection is then effected by means of a wire 14, thus joining each couple of sections together by means of a continuous hinge. By making each eye wholly on one side of the section, as seen best at Figs. 4 and 5, tight joints are produced, so that little, if any, light can be seen through the hinges, thus conducing to the excellence of the acoustic properties of the horn. It will be understood that the wires 14, considered either alone or in connection with the eyes 13, constitute stiffening ribs at the joints of the bell. This, furthermore, is a very substantial and durable method of connecting the sections and forming the bell, and may be resorted to even in cases where it is not desired to produce a foldable bell; and in such a case, the joints may be additionally stiffened by the use of a little solder, if desired, and the eyes may be on the outside instead of on the inside of the bell; and each of the sections may be in the form of a single or integral plate, as seen at Fig. 7.

One method of forming a collapsible horn consists in dividing each of the said sections into two strips, which are hinged together in the manner already described. A pair of such strips marked A and B is seen at Fig. 10. A blank for making such strips is seen at Fig. 6; tongues 15 being formed on the right hand side edge at said figure, which tongues are bent to form eyes 16. These eyes are connected by a wire 14, thereby forming a hinge similar to the hinge 11, with the exception that this hinge, marked 17, is straight as at Fig. 10, when the bell is folded, and that the hinge is on the outside of the bell, Fig. 1. Each of the strips A, B, therefore, has one straight side edge, along which edge the strips are joined to form a pair, such pair corresponding in dimensions to one of the sections above mentioned. The outer side edge of each strip diverges from the inner side edge from the neck to the mouth of the bell, Fig. 10.

The horn may be folded in the form seen in full lines at Fig. 12, by simply turning the strips upon the hinges alternately in and out in the manner of the plaits of a common fan, eight of the sections; or sixteen of said strips being treated in this manner, whereby two sets of strips or plaits, marked

respectively C and D, are folded and packed facewise together, one set opposite the other set. Preferably, sections 1 and 6 are undivided or formed each in a single integral piece, or plate, as shown, so that the sets of plaits C and D fold compactly between the sections 1 and 6, the rigidity of the latter sections being of value in making a comparatively stable package of the folded bell. Preferably, said sections 1 and 6 are made each a little wider than the remaining sections, so as to leave a clearance E between the sets of plaits C and D. This package, at Fig. 12 it will be seen, has minimum dimensions, being of a length equal to the length of the bell, and of a width equal to the width of one section, and of a thickness equal to the thickness of ten sections, so that it can be packed conveniently with a phonograph for shipment, and can be conveniently transported or stored by the user.

In opening the bell, from the Fig. 12 position to the Fig. 11 position, when the same is nearly open, each pair of strips is sprung outwardly from the Fig. 3 to the Fig. 2 position, near its outer edge, this characteristic of springing or buckling being due to the curvature of the outer side edge of each strip, where one section joins the next; and it contributes to the stiffness of the bell. It will be understood that the hinge wires 14 in the joints 17 are straight in the Fig. 1 position, but are flexed outwardly when the bell is opened; and it will also be understood that the strips A and B should be relatively narrow and long, as the use of a relatively large number in building up the bell renders it more convenient to fold and open the same.

It will be perceived that all of the strips are permanently connected, so that the structure is continuous, and for ordinary purposes inseparable at any point, whether open as at Figs. 1 and 11, or closed as at Fig. 10, so that in opening or closing, it is only necessary to unfold or fold as the case may be without the necessity of manually joining or disjoining any of the sections. This form of joint between the sections is valuable, because undue springing or tensioning of the metal in forming seams, as heretofore generally practiced, is avoided, and hence the bell delivers the sounds more clearly than prior horns of this type. At its outer end each of the strips or sections is rolled over wire 18 as seen at 19, Fig. 3, thus to stiffen the bell and protect said edge from injury.

In assembling the horn, after the bell opened, I preferably insert a funnel or tapering tube 20, whose large end fits close within the tapering neck of the bell. Over this funnel, I place a second funnel 21 which fits over said bell neck; and a nut 22 is turned upon a threaded projecting portion 23 of the inner funnel, and bears upon



against the end 24 of the outer funnel to force the same up over the bell neck, and simultaneously draw the funnel 20 outwardly within said neck. The funnel 21 tends to wedge the neck inwardly while the funnel 20 tends to wedge the neck outwardly, and as a result the neck is firmly clamped between said funnels, thus producing a rigid and substantial phonograph horn. An air space 25 is formed between said funnels, and tends to avoid faulty acoustic action. A nipple 26 is formed on the inner funnel beyond the threaded part 23.

At Fig. 8 is shown a form of funnel or tip for a bell adapted to another style of phonograph from the Fig. 1 construction. In this case, the tip 26<sup>a</sup> is tapering, and the funnel 20<sup>a</sup> is relatively short, while the outer funnel 21<sup>a</sup> is so short as to be little more than a ferrule to bind the neck of the horn against the inner funnel; this being accomplished by a nut 22<sup>a</sup> of relatively large diameter.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. A flaring-mouth and approximately circular bell forming part of a phonograph horn, comprising a series of flexible sheet metal strips joined edge to edge by means of metal hinges, the latter consisting of ears formed on the strips and wire pintles passing through the ears, and means to stiffen the small end of the bell.

2. An approximately circular bell forming part of a phonograph horn, comprising a series of metal strips, every one of which is permanently connected by means of movable joints to both of the adjoining strips, the joints and strips sufficiently flexible to permit the bell to flare at its mouth, and means to stiffen the small end of the bell.

3. A collapsible bell for a phonograph horn comprising a series of strips connected together at their side edges by hinged joints, said joints folding inwardly and outwardly alternately.

4. A collapsible bell for a phonograph horn comprising a series of strips connected together at their side edges by hinged joints, two of said strips being wider than the remainder and separated from each other by other strips arranged in pairs, the jointed edges of which latter fold inwardly and outwardly alternately.

5. A collapsible bell for a phonograph horn comprising a series of strips connected together at their side edges by hinged joints, said strips being arranged in pairs, the inner edges of the strips in each pair being straight and the outer edges of the strips in each pair being curved, the hinged joints of said straight edges folding inwardly and those of the curved edges folding outwardly.

6. A collapsible bell for a phonograph horn comprising a series of strips connected together by hinged joints, at least one of said strips being broader than the others and the remainder of said strips being arranged in pairs, the hinged joints of which latter fold inwardly and outwardly alternately.

7. A collapsible bell for a phonograph horn comprising a series of strips connected together by hinged joints, some of said strips being arranged in pairs, the hinged joints between the strips being alternately on the inside and the outside of the bell.

8. A collapsible bell for a phonograph horn comprising a series of strips connected together at their side edges by hinged joints, two of said strips being wider than the remainder, provided with curved edges and diametrically disposed with reference to each other and the intervening strips being arranged in pairs, the inner edges of the strips in each pair being straight, and the outer edges in each pair being curved, whereby the paired strips when collapsed form two groups of plaits intermediate the broader strips.

9. A collapsible bell for a phonograph horn, comprising in its collapsed condition two sections, each having curved side edges, said sections being connected by means of two sets of relatively narrow strips, the strips in each set being connected to one another and to the outside sections by means of hinges.

10. A collapsible bell for a phonograph horn, comprising in its collapsed condition two sections, each having curved side edges, said sections being connected by means of two sets of relatively narrow strips, the strips in each set being connected to one another and to the outside sections by means of hinges, each narrow strip having an outer curved edge and an inner straight edge.

11. A collapsible bell for a phonograph horn, comprising in its collapsed condition two sections, each having curved side edges, said sections being connected by means of two sets of relatively narrow strips, the strips in each set being connected to one another and to the outside sections by means of hinges, each narrow strip having an outer curved edge and an inner straight edge, the curvature of the outer edges of said strips agreeing with the curvature of the edges of said outside sections.

12. A phonograph horn comprising a series of strips connected together at their side edges by movable joints, said strips arranged in pairs, the inner edges of the strips in each pair being straight, and the outer edges of the strips in each pair being curved to give the desired contour to the bell.

13. A phonograph horn comprising a series of strips connected together at their side edges by movable joints, said strips ar-



14. A phonograph horn comprising a series of strips connected together at their side edges by movable joints, said strips arranged in pairs, the leading edges of the strips in each pair being straight, and the outer edges of the strips in each pair being curved to give the desired contour to the bell; said bell also comprising a plurality of sections about equal in width to a pair of said strips, and having curved side edges.

15. A bell for a phonograph horn comprising a series of sheet metal strips, each having a set of hinge eyes formed along each side edge to alternate with the eyes of the adjoining strip, and wires threaded through the eyes to connect the strips.

16. A bell for a phonograph horn comprising a series of sheet metal strips, each having a set of hinge eyes formed along each side edge to alternate with the eyes of the adjoining strip, and wires threaded through the eyes to connect the strips, certain of said side edges being curved, and said wires forming flexible pintles to permit the bell to collapse.

17. An approximately circular bell forming part of a phonograph horn comprising a series of sheet metal strips, every one of which is permanently hinged at its side edges to both of the adjoining strips, by means of hinge ears formed upon the strips and flexible pintles passing through the ears, and means to stiffen the small end of the bell.

18. An approximately circular bell forming part of a phonograph comprising a series of strips having a succession of eyes formed along each side edge and integral with their respective strips, wires passing through said eyes to join the strips together, and means to stiffen the small end of the bell.

19. A collapsible bell for a phonograph horn comprising strips hinged together at their side edges, and foldable one upon another in the manner of a plaiting, said strips having a straight contour along their inner side edges, and a curved contour along their outer side edges.

20. A collapsible bell for a phonograph horn comprising strips hinged together at their side edges, and foldable one upon another in the manner of a plaiting, said strips having a straight contour along their inner side edge, and a curved contour along their outer side edges, said horn also comprising two broad sections similarly connected to the

strips, each broad section of slightly greater width than a pair of said strips, and the strips being folded in two sets between said broad sections.

21. A collapsible approximately circular bell forming part of a phonograph horn comprising a series of strips, every one of which is connected at its side edges by means of movable joints to both of the adjoining strips in a manner to permit the folding of the horn to pack all the strips face-wise together; said strips and joints so shaped and so flexible as to cause the bell to flare at its mouth, and means to stiffen the small end of the bell.

22. A bell for a phonograph horn comprising two sets of strips, each set comprising four pairs, and two broad sections, the strips in each set hinged each to the next along its side edges, and said sets being opposed to each other and hinged to the side edges of said broad sections.

23. As a new article of manufacture, a series of phonograph horn strips hinged each to the next along their side edges, said strips comprising a number of pairs, the strips in each pair being straight-edged along the joint which unites them, and having their outer side edges curved to form the contour of the horn.

24. As a new article of manufacture, a metal strip to form a plait or section of a phonograph horn, said strip having one side edge straight, and the other side edge curved.

25. As a new article of manufacture, a metal strip to form a plait or section of a phonograph horn, said strip having one side edge straight, and the other side edge curved; tongues being formed along each of said side edges and bent to form eyes to receive a connecting wire.

26. A bell for a phonograph horn comprising strips mounted in pairs, the strips in each pair hinged each to the other along a straight line, the outer edges of the pairs being divergent from each other, and each pair hinged to the next.

27. As a new article of manufacture, a series of phonograph horn strips hinged each to the next along their side edges, said strips comprising a number of pairs, the strips in each pair being straight-edged along the joint which unites them, and having their outer side edges shaped to form the contour of the horn and provided with tongues to receive joining wires.

28. A pair of metal strips joined together to form a section of a phonograph horn, each of said strips having its inner side edge straight, the joint between said strips extending along the median line of said section, and the outer side edges of said strips diverging from each other.

29. As a new article of manufacture, a flexible metal section of a phonograph horn,

both side edges curved; tongues being formed along one of said side edges and bent to form eyes to receive a connecting wire.

5 30. As a new article of manufacture, a flexible metal section of a phonograph horn, both side edges curved; tongues being formed along each of said side edges and bent to form eyes to receive a connecting wire.

10 31. A pair of metal strips joined together to form a section of a phonograph horn, each of said strips having its inner side edge straight, the joint between said strips extending along the median line of said section, and the outer side edges of said strips diverging from each other; and formed with hinge eyes.

15 32. As a new article of manufacture, a series of phonograph-horn tapering strips of flexible sheet metal formed along their side edges with tongues bent to form eyes, the eyes on each strip alternating with those of the contiguous strip, and wires passing through the eyes to connect the strips together.

20 33. A flaring-mouth approximately circular bell forming part of a phonograph horn comprising tapering sections of sheet metal, each of said sections having curved side edges, said side edges permanently connected together by means of eyes provided along said curved edges, and wires passing through the eyes.

25 34. A bell for a phonograph horn comprising tapering sections of sheet metal, each of said sections having curved side edges, said side edges permanently connected together by means of eyes provided along said curved edges, and wires passing through the eyes; certain of said sections consisting each of a pair of strips hinged together at their contiguous edges.

30 35. A bell for a phonograph horn comprising tapering sections of sheet metal, each of said sections having curved side edges, said side edges permanently connected together by means of eyes provided along said curved edges, and wires passing through the eyes; certain of said sections consisting each of a pair of strips hinged together at their contiguous edges; the section hinges being on the outer side of the horn, and the strip hinges being on the inner side thereof.

35 36. A phonograph horn comprising a bell, a funnel fitting within the small end of the bell and having a screw thread at its small end, a second funnel inclosing the first funnel and also fitting over the small end of the bell, and a nut upon said threaded portion to bear against the small end of the outer funnel to force the latter up onto the bell and draw the first funnel down within the bell, thereby to clamp the bell between said funnels.

37. A phonograph horn comprising a collapsible bell, an inner detachable ferrule and an outer detachable ferrule for the small end of said bell, and means for causing said ferrules to clamp the bell.

38. A phonograph horn comprising a bell, funnels one within the other and fitting respectively within and without the small end of said bell, and means for effecting relative bell-clamping movement between said funnels.

39. A phonograph horn comprising a bell, funnels one within the other and fitting respectively within and without the small end of said bell, and means for effecting relative endwise bell-clamping movement between said funnels.

40. A phonograph horn comprising a bell having a tapering small end, funnels of corresponding taper and arranged one within the other and fitting respectively within and without said end of the bell, and means for moving one funnel upon the other in a manner to clamp the bell.

41. A phonograph horn comprising a bell having a tapering small end, funnels of corresponding taper and arranged one within the other and fitting respectively within and without said end of the bell, said funnels being relatively movable endwise to clamp the bell between them, and means to secure the funnels in clamping position.

42. An approximately circular phonograph horn comprising a collapsible bell composed of a series of strips connected together at their side edges by hinged joints, said bell having a tapering small end, a funnel fitting said end, and an annular device for stiffening the small end of the bell and securing it to said funnel.

43. A phonograph horn comprising a bell and two funnels one within the other and connected to said bell.

44. A phonograph horn comprising a bell and two funnels one within the other, and connected to said bell; an air space intervening between said funnels.

45. A phonograph horn comprising a collapsible bell having a tapering neck, a funnel fitting in said neck, and means inclosing said neck, and connected to said funnel for drawing the latter down tightly into said neck.

46. A bell for a phonograph horn comprising a number of flexible sections of sheet metal having curved side edges connected by metal hinges.

47. A flaring-mouth bell forming part of a phonograph horn and comprising a number of flexible sections of sheet metal having side edges all of which are permanently connected by metal hinges.

48. A phonograph horn having a collapsible bell comprising a number of flexible strips having jointed side edges, a funnel



1117

inserted within the neck of said bell, and means inclosing said neck to draw said funnel down and clamp the neck thereto.

49. A phonograph horn having a bell comprising a number of flexible strips having side edges permanently hinged together, a funnel inserted within the neck of said bell,

a second funnel inclosing said neck, and means for causing said second funnel to clamp said neck.

PAUL B. T. BERNER.

Witnesses:

JOHN O. SELFERT,  
KITIE FRANKFORT.

[Endorsed]: No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Exhibit 44. Filed Apr. 8, 1916. F. D. Monckton, Clerk.





No. 811,877.

PATENTED FEB. 6, 1906.

C. A. SENNÉ.  
PHONOGRAPH HORN.

APPLICATION FILED NOV. 1, 1904.

2 SHEETS—SHEET 1.

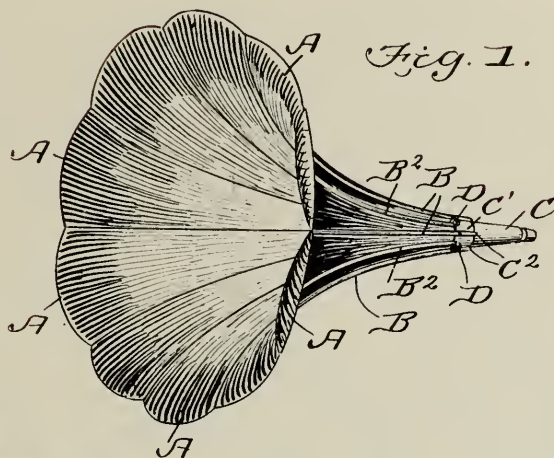


Fig. 1.

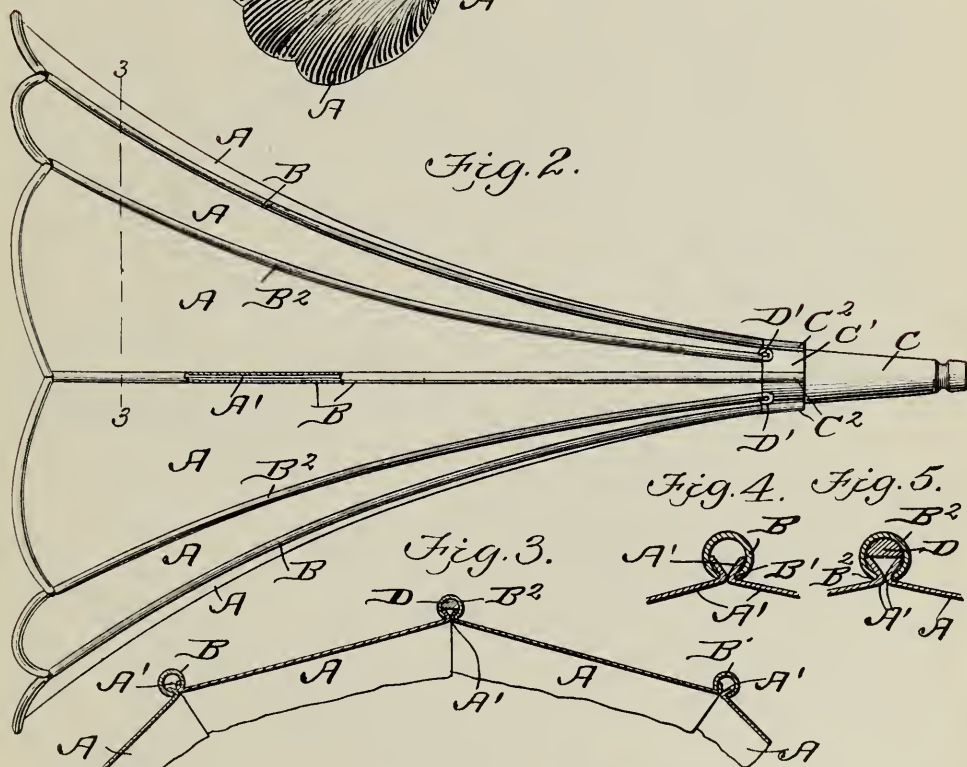


Fig. 2.

Fig. 4. Fig. 5.

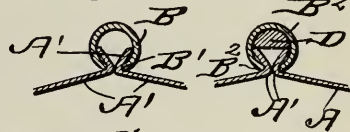


Fig. 3.

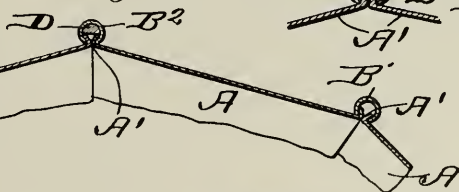


Fig. 6.

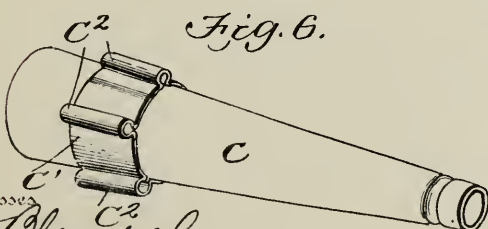
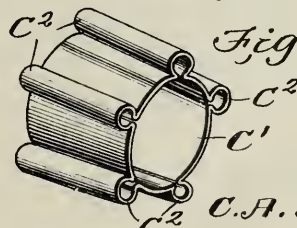


Fig. 7.

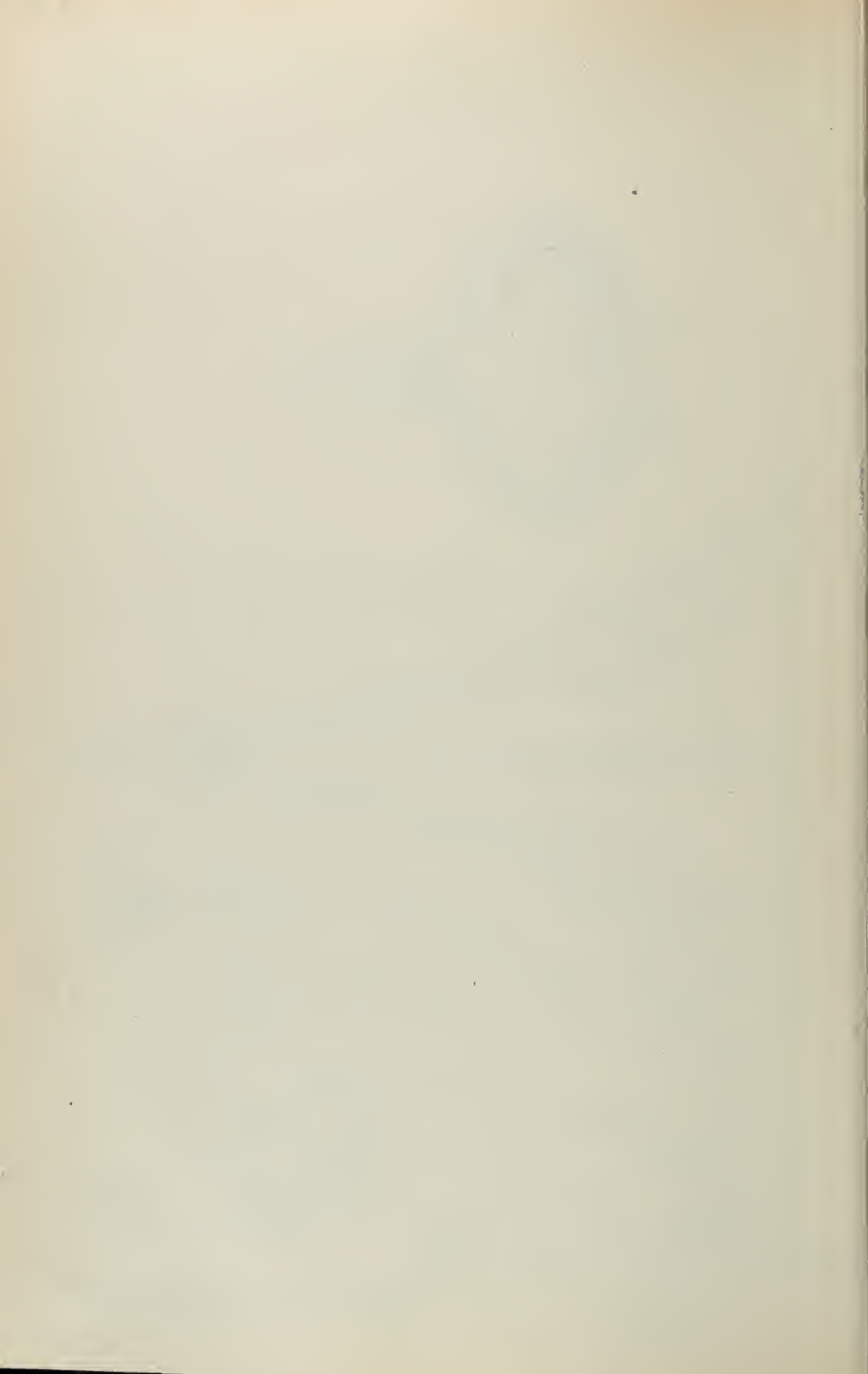


Inventor

C. A. Senné.

Witnesses  
 M. J. Blondel,  
 E. B. McBeth.

By O'Meara & Brock  
 Attorneys.



No. 811,877.

PATENTED FEB. 6, 1906.

C. A. SENNÉ.  
PHONOGRAPH HORN.  
APPLICATION FILED NOV. 1, 1904.

2 SHEETS—SHEET 2.

Fig. 8.

Fig. 9.

Fig. 9<sup>a</sup>.

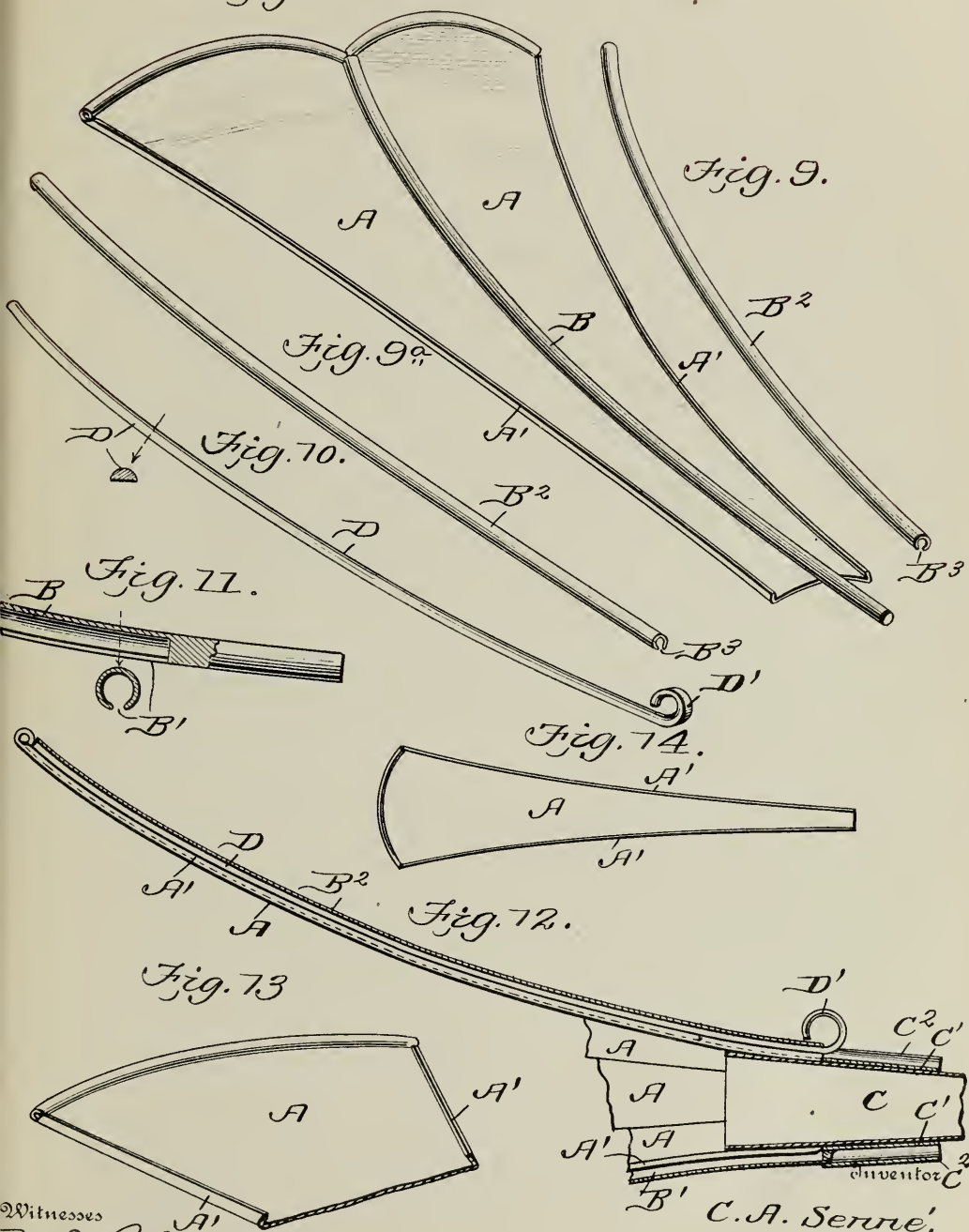
Fig. 10.

Fig. 11.

Fig. 14.

Fig. 12.

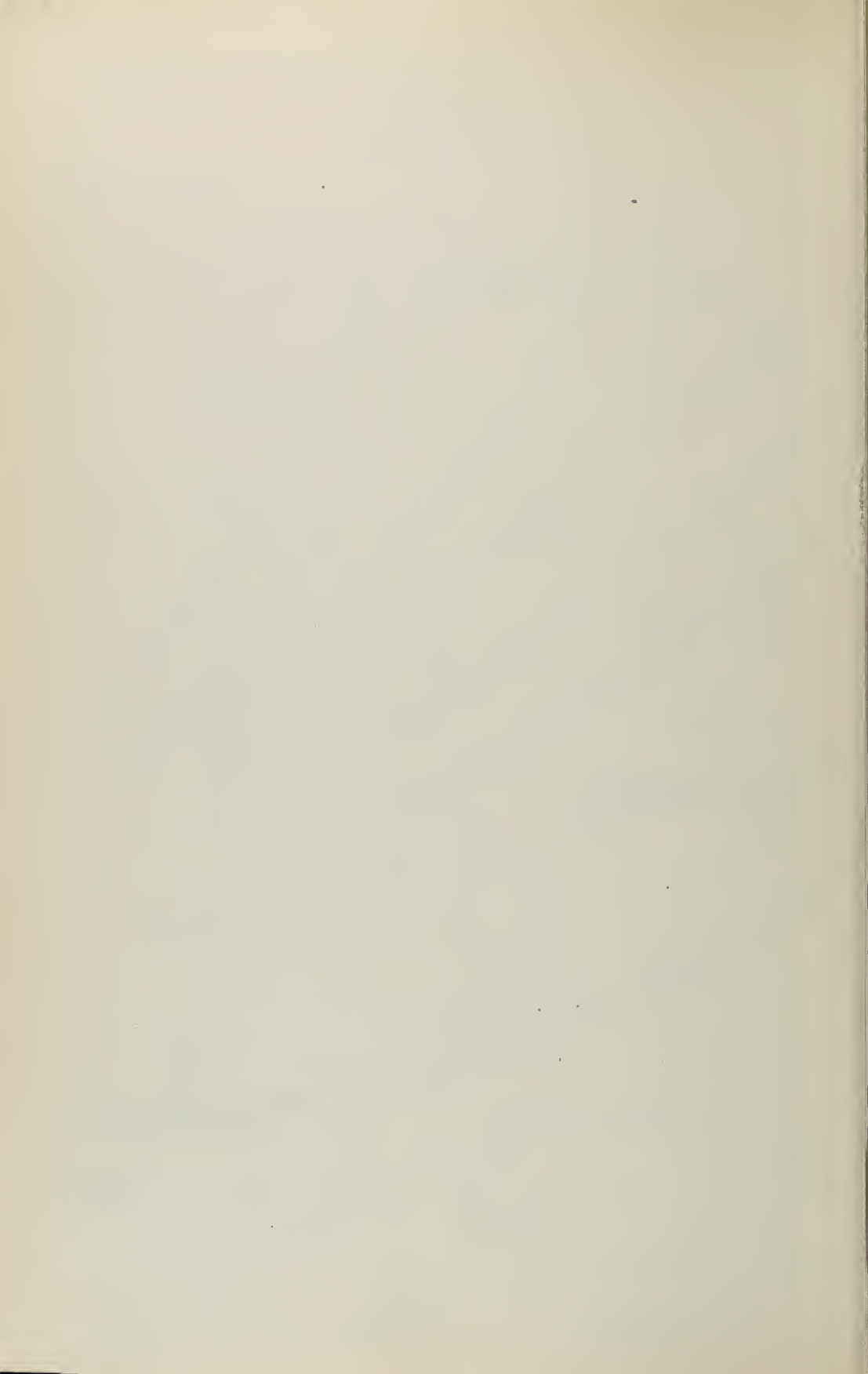
Fig. 13.



Witnesses

McDonald,  
E. B. McBath.

By C. A. Senné,  
Attorneys.





CAMILLUS ANTONETTE SENNÉ, OF NEW YORK, N. Y.

## PHONOGRAPH-HORN.

No. 811,877.

Specification of Letters Patent.

Patented Feb. 6, 1906.

Application filed November 1, 1904. Serial No. 231,003.

*To all whom it may concern:*

Be it known that I, CAMILLUS ANTONETTE SENNÉ, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improved Phonograph-Horn, of which the following is a specification.

This invention relates to an improved collapsible horn especially designed for use in connection with phonographs and the like, the object being to provide a horn that may be "knocked down," so that it may be readily packed in a small space and also that its transportation may be facilitated.

With these briefly-stated objects in view, the invention consists in providing a series of blades or sections, each having their edges formed with flanges over which is secured a locking-rib, by which the sections are securely held together, and sleeves having tubular portions engaging alternate ribs, the device as a whole being in the shape of a horn.

The invention also comprises means for holding the horn to the tube-nozzle, which is also employed for locking the sections and holding the horn in a perfectly secure condition.

The invention further consists in certain details of construction and novelties and combinations of parts as will be fully described in the following specification and pointed out in the claims, reference being had to the drawings, in which—

Figure 1 is a perspective view of a horn constructed in accordance with my invention. Fig. 2 is a plan view of the same. Fig. 3 is a detail section on the line 3 3 of Fig. 2. Figs. 4 and 5 are enlarged detail sections drawn through the uniting-ribs and flanges. Fig. 6 is a detail perspective view of the tube-nozzle, showing my improvement arranged therein. Fig. 7 is a detail perspective view of my improved sleeve that fits upon the tube-nozzle. Fig. 8 is a detail perspective view of one of the sections of the horn. Figs. 9 and 9<sup>a</sup> are detail views of the hollow uniting-ribs. Fig. 10 is a detail view of one of the strips which are arranged in the ribs. Fig. 11 is a detail section of the inner end of one form of uniting-rib. Fig. 12 is a longitudinal section drawn through one of the uniting-ribs and the tube-nozzle. Fig. 13 is a detail perspective view of the outer end of one of the blades, and Fig. 14 is a detail plan view of a complete blade.

In constructing a horn in accordance with

my invention, I employ a series of blades or strips A, which may be of any suitable material, each being wider at its outer end and tapering upon a curved line to its inner end, so that when all of the blades are assembled they will produce a horn having a flaring mouth, or, in other words, bell-shaped; but this special design is not essential, as the tapering blades may be perfectly straight upon their longitudinal edges, in which case a horn shaped like a truncated cone will be produced. The longitudinal edges of each blade are bent outwardly and inwardly to provide a flange A', over which is placed a tubular rib B, having slots B' arranged upon their lower longitudinal surface through which the flanges project, and by bending the flanges, as described, when the ribs are arranged thereon the sections will be firmly and securely locked together. In practice I propose to arrange these blades in pairs or sections, as shown in Fig. 8 of the drawings, and to permanently retain the ribs B thereon and to provide the ribs of a greater length than the blades, so that their inner ends will project slightly beyond the inner ends of the sections, the projected ends being made solid to add strength to the ribs. In order to hold these sections in position, I provide a tube-nozzle C with a sleeve or band C', which is made of a single length of material and bent at regular intervals to provide a series of tubular sections or barrels C<sup>2</sup>, and in these barrels the projecting ends of the ribs B are held when the horn is complete. As the blades are arranged in sections, as before described, and the ribs B employed for holding the sections together the opposite flanged edges of each section will be free, and to unite them I employ tubular ribs B<sup>2</sup>, slotted throughout their entire length, as shown at B<sup>3</sup>, and in practice the ribs B<sup>2</sup> are slipped over the flanges from their inner ends and pushed thereon until the entire surface of the flanges is covered. Of course it will be understood that these ribs B<sup>2</sup> are of a length to equal that of the longitudinal edges of the blades A, and in order to securely hold them in position and to securely lock them in position I employ strips D, semicircular in cross-section, which are inserted in the ribs so that their flat surface will engage the edges of the flanges, and their circular edges will engage the inner surface of the ribs and in order to facilitate the withdrawal of the strips D and also their insertion into the ribs I propose to



A 22

bend their inner ends back upon themselves, as shown at D'.

In setting up a horn constructed like my invention I first place the sleeve C' upon the hose-nozzle and then take the sections formed by the blades A and insert the projecting ends of the ribs into each of the tubular sections or barrels C'. The ribs B<sup>2</sup> are then pushed over the flanges of the abutting blades, the strips D inserted into the ribs B<sup>2</sup>, and the complete horn is then produced. It will be readily seen that this operation is exceedingly simple, and it is only necessary to withdraw the ribs and strips from the sections and each section disconnected from the nozzle-tube and the sections may be readily packed into a very small space.

In practice I prefer to bend the free ends of the blades at their outer ends back upon the body of the blade in a circular form and to insert a wire therein, which adds to the artistic effect of the device, besides strengthening the outer ends of the blades as well as avoiding sharp surfaces.

From the foregoing it will also be seen that I provide a collapsible horn so constructed that will take up very little space when in a knocked-down form.

I have found from actual experience that when the horn is set up the vibrations caused by the sound are not impaired and a perfectly clear tone is produced.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A horn comprising a series of blades, each having flanges upon their longitudinal edges, ribs engaging said flanges, and a sleeve having tubular portions in which the alternate ribs are held.

2. A horn comprising a series of blades, each having flanges upon their longitudinal edges, ribs engaging said flanges, a sleeve having tubular portions in which the alternate ribs are held, and a tube-nozzle for supporting the said sleeve.

3. A horn comprising a series of blades, each having flanges upon their longitudinal edges, ribs engaging the flanges, the alternate ribs projecting beyond the inner ends of the blades, a sleeve having tubular sections in which the projecting ends of the ribs are held, a tube-nozzle for supporting the sleeve and strips engaging the remaining alternate ribs.

4. A horn comprising a series of flanged blades arranged in pairs, the blades of each pair being united by means of ribs which extend beyond the inner ends of the blades, tubular ribs for uniting the abutting edges of each pair, and means for engaging the projecting ends of the first-named ribs.

5. A horn comprising a series of blades arranged in pairs each pair having a rib projecting therefrom, a sleeve having tubular portions in which the projected ends of the

ribs are held, tubular ribs for uniting the edges of each pair of blades, strips arranged within the said tubular ribs, and a tube-nozzle for supporting the sleeve.

6. A horn comprising a series of tapering blades, each being flanged upon their longitudinal edges, tubular ribs engaging the abutting flanges of each blade for locking the blades together, the alternate ribs projecting beyond the inner ends of blades, a sleeve having tubular sections in which the projected ends of the ribs are held, and a tube-nozzle for supporting the sleeve.

7. A horn comprising a series of blades, each being tapered from its outer to its inner end, and flanged along the said tapering edges, tubular ribs engaging the flanges for uniting the blades, the alternate ribs projecting beyond the blades and made solid, strips arranged within the opposite alternate ribs, and a sleeve connected to the projected ends of the ribs.

8. A horn of the kind described, comprising a series of tapering blades arranged in pairs, each blade being flanged upon its longitudinal tapering edges, said blades being arranged in pairs, ribs engaging the flanges to unite the blades to form the pairs, said ribs projecting beyond the inner ends of each pair, a sleeve having tubular portions in which the projected ends of the ribs are held, tubular ribs engaging the abutting flanges of each pair, and strips arranged within the last-named ribs.

9. A horn of the kind described, comprising a series of tapering blades, each having a flange upon its longitudinal edges, said blades being arranged in pairs, and held together by tubular ribs, the ends of which project beyond the inner ends of the blades, a sleeve having tubular portions in which the projected ends of the ribs are held, tubular ribs engaging the abutting flanges of each pair of blades, several cylindrical strips arranged within the last-mentioned ribs and engaging the flanges of the blades for the purpose specified.

10. A horn comprising a series of longitudinal tapering blades, each having its longitudinal edges bent outwardly and inward to form flanges which diverge when the abutting edges of the flanges are placed together, tubular ribs fitting over the flanges, the alternate ribs projecting beyond the inner ends of the blades, a sleeve having tubular sections in which the said projecting ends of the ribs are held, the remaining alternate ribs being of the same length as the blades, and strips arranged within the last-mentioned ribs, said strips having one end bent to provide a rim all substantially as and for the purpose specified.

CAMILLUS ANTONETTE SENNE.

Witnesses:

M. D. BLONDEL,

E. M. VERNER.

[Endorsed]: No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Exhibit 39. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



No. 829,066.

PATENTED AUG. 21, 1906.

W. S. FERNAN.  
 PHONOGRAPH HORN.  
 APPLICATION FILED JAN. 15, 1906.

Fig. 1.

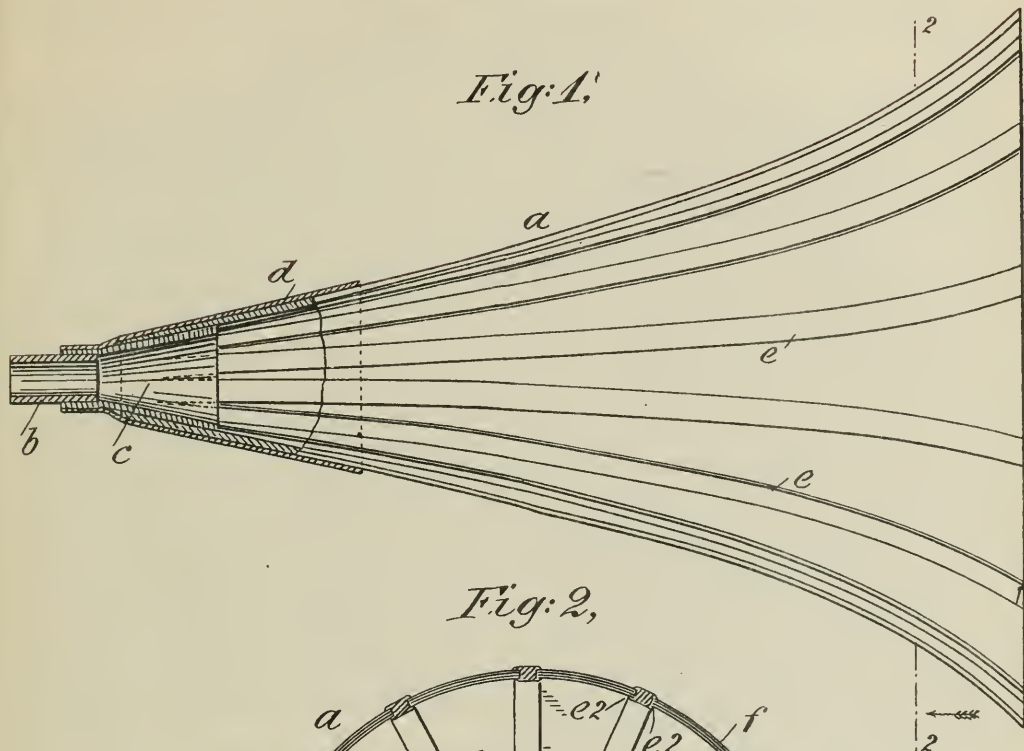
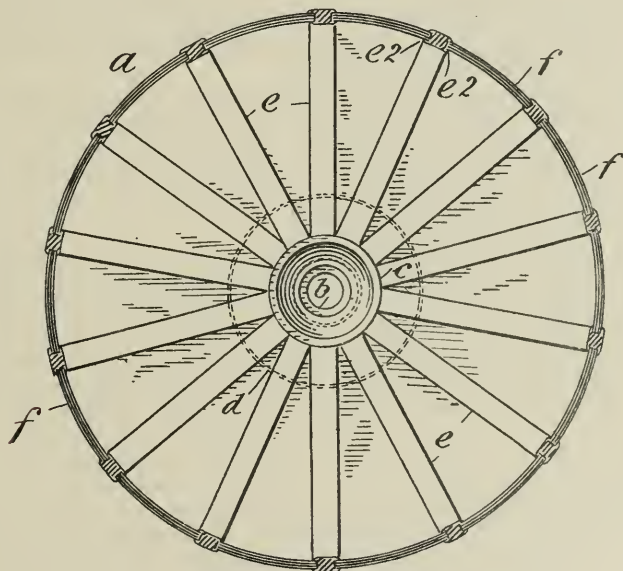


Fig. 2.



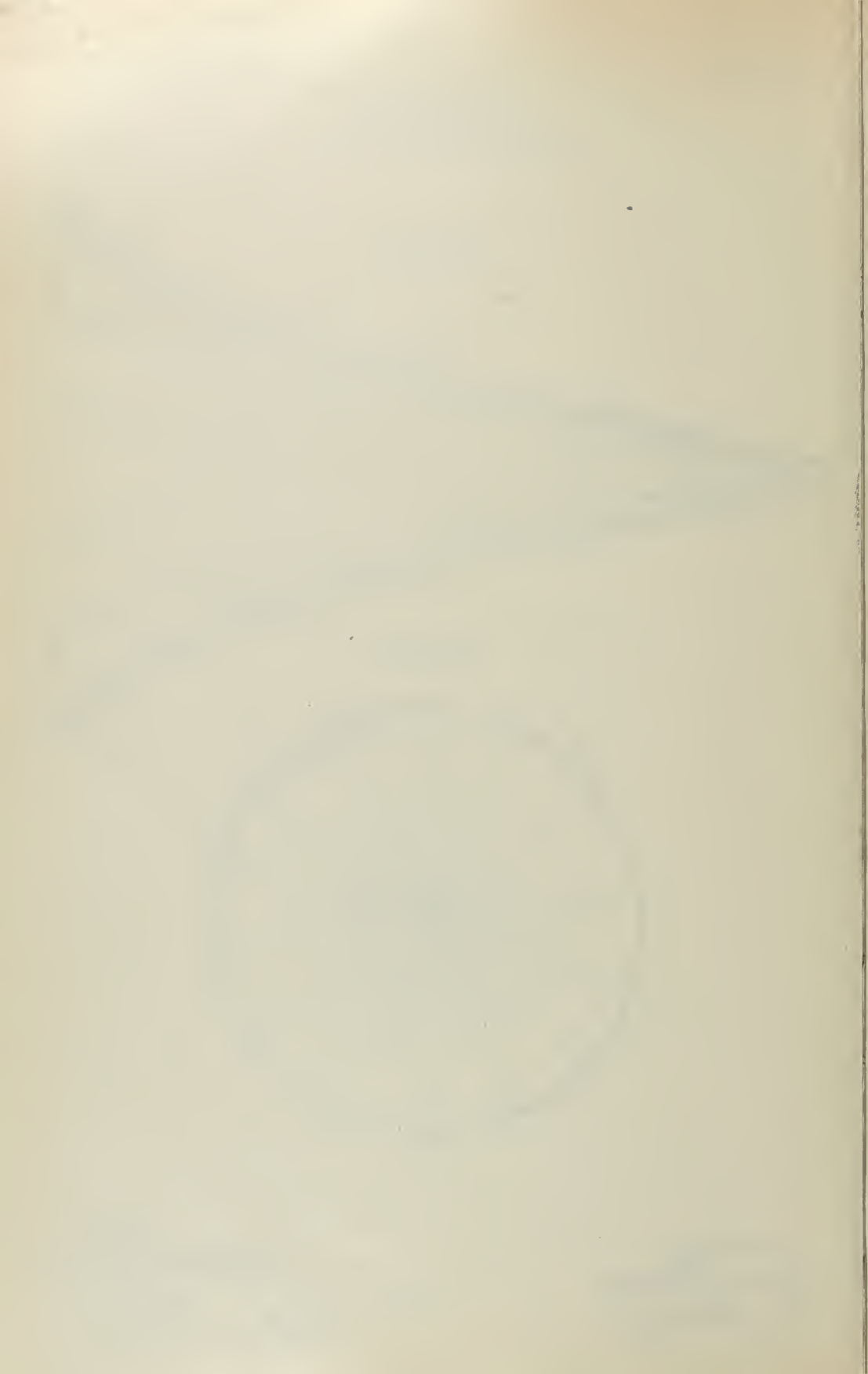
WITNESSES

Ernest Hagens.  
 J. A. Stewart

INVENTOR

BY HIS

Walter S. Fernan  
 Edgar Tate & Co  
 ATTORNEYS





# UNITED STATES PATENT OFFICE.

WALTER S. FERNAN, OF NEW YORK, N. Y.

## PHONOGRAPH-HORN.

No. 829,066.

Specification of Letters Patent.

Patented Aug. 21, 1906.

Application filed January 15, 1906. Serial No. 296,076.

*To all whom it may concern:*

Be it known that I, WALTER S. FERNAN, a citizen of the United States, residing at New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Phonograph-Horns, of which the following is a specification, view as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to the delivery-horns of phonographs and other machines of this class; and the object thereof is to provide a delivery-horn for machines of the class specified which will do away with the mechanical, harsh, and metallic sounds usually produced in the operation of such machines and also produce a full, even, and continuous volume of sound in which the articulation is clear, full, and distinct, a further object being to provide a horn of the class specified which is made entirely of wood or other fibrous material; and with these and other objects in view the invention consists in a horn of the class specified constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which—

Figure 1 is a side view, partly in section, of my improved delivery-horn for phonographs and similar machines, and Fig. 2 a transverse section of the horn on the line 2 2 of Fig. 1.

In the practice of my invention I provide a delivery-horn *a* for phonographs and other talking-machines or music-reproducing machines provided at its smaller end with the usual nozzle-piece *b*, by means of which connection is made with the machine in the usual manner, and in the form of construction shown a supplemental horn-piece *c* is employed between the body portion of the horn and the nozzle-piece *b* and in which the nozzle-piece *b* is secured, the supplemental piece serving as means for connecting the body portion of the horn with the nozzle-piece, and the smaller end of the horn is also provided with a shield or covering *d*, which extends, in the form of construction shown, from the smaller end of the piece *c* a predetermined

distance along the smaller end of the horn and serves as a reinforcement therefor.

The body portion of the horn is composed of a plurality of longitudinal ribs *e*, separated by tapering spaces which gradually widen from the smaller end to the larger end of the horn, and these spaces are filled in with web members *f*, composed of a plurality of layers of wood or other fibrous material secured together, and the edges of the said web members fit in grooves *e*<sup>2</sup>, formed in the opposite sides of the rib members *e*. In the form of construction shown the web members *f* are composed of three separate layers of material; but it will be apparent that other numbers of layers of material may be employed, and the said layers of material are in practice, if more than one layer be employed, secured together before the said web members are secured in place between the ribs *e*.

All the parts of my improved horn, including the nozzle-piece *b*, the short tube member *c*, and the shield or covering *d*, are composed of wood or other fibrous material, and my invention is not limited to the use of the part *c*; but I prefer to use said part, as it forms a reinforcement and strengthening device for the smaller end of the horn.

A horn made in this manner will not produce the harsh metallic and other objectionable sounds usually produced by the delivery-horns of instruments or machines of the class specified, and changes in and modifications of the construction described may be made without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A delivery horn for phonographs and similar machines, the body portion of which is composed of longitudinal ribs having oppositely-disposed side grooves, and tapering webs secured in said grooves, substantially as shown and described.

2. A delivery-horn for phonographs and similar machines, the body portion of which is composed of longitudinal ribs having oppositely-disposed side grooves, and tapering webs secured in said grooves, said webs being composed of separate layers of material, substantially as shown and described.

3. A delivery-horn for phonographs and similar machines, the body portion of which is composed of longitudinal ribs having oppositely-disposed side grooves, and tapering webs secured in said grooves, said ribs and said webs being composed of fibrous material, substantially as shown and described.

In testimony that I claim the foregoing as

my invention I have signed my name, in presence of the subscribing witnesses, this 13th day of January, 1906.

WALTER S. FERNAN.

Witnesses:

F. A. STEWART.

C. E. MULREANY

It is hereby certified that the name of the patentee in Letters Patent No. 829,066, granted August 21, 1906, for an improvement in "Phonograph-Horns," was erroneously written and printed "Walter S. Fernan," whereas said name should have been written and printed *Walter S. Fernau*; and that the said Letter's Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of February, A. D., 1908.

[SÉAL.]

C. C. BILLINGS,

*Acting Commissioner of Patents.*

[Endorsed]: No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Specifications and Drawings in Letters-Patent No. 829,066. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



G. BENJAMIN &amp; W. HANDLEY.

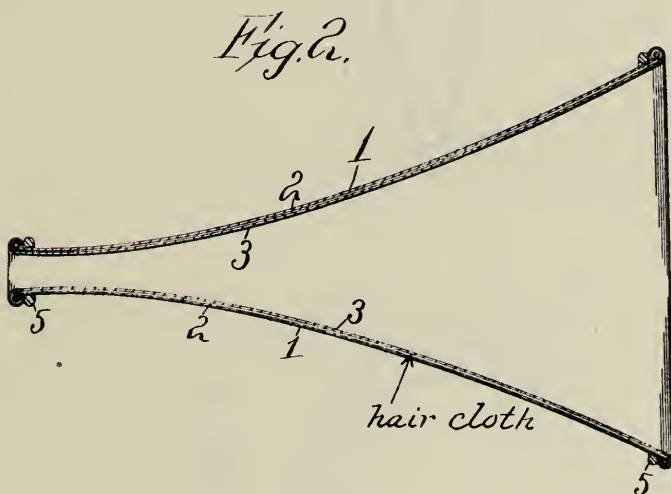
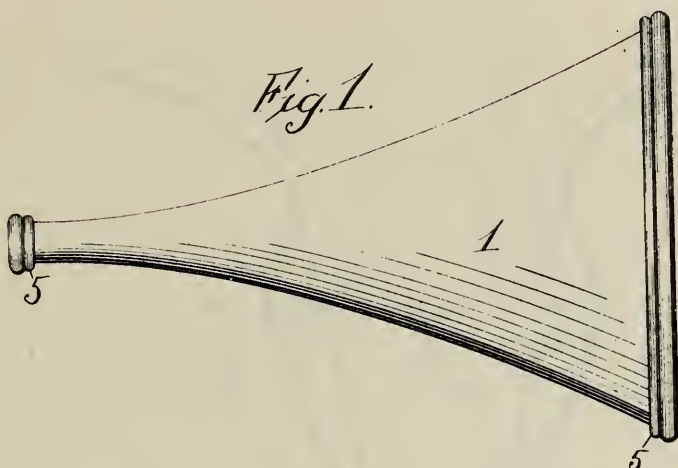
PHONOGRAPH HORN.

APPLICATION FILED AUG. 22, 1908.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.

917,404.



Attest.  
*R. H. Stoddard*

*George Benjamin* Inventors:-  
*Wm. Handley*





G. BENJAMIN &amp; W. HANDLEY.

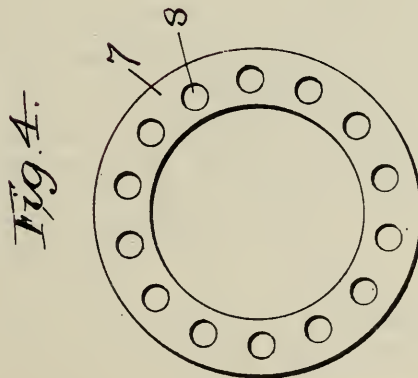
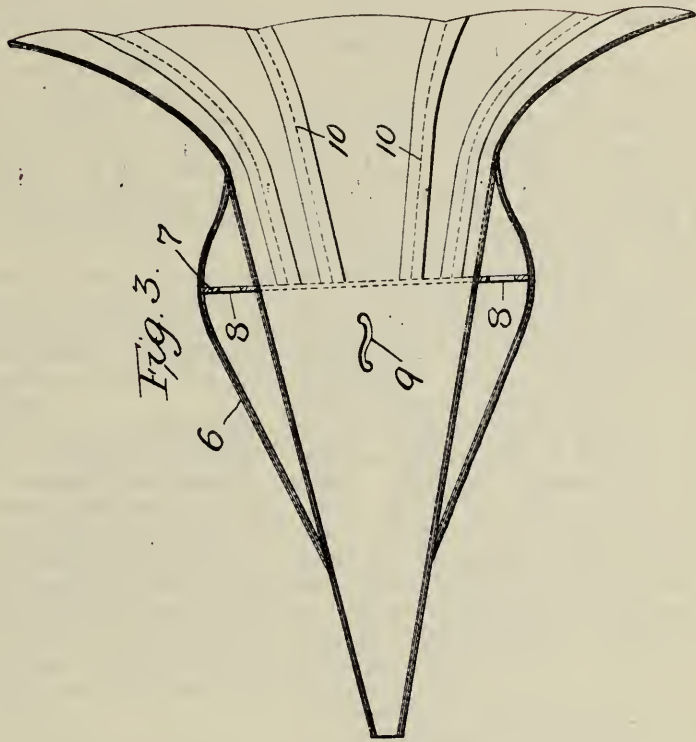
PHONOGRAPH HORN.

APPLICATION FILED AUG. 22, 1908.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 2.

917,404.



Attest.

Bentley &amp; Stahl

[Signature]

Inventor  
 George Benjamin  
 William Handley  
 by Spear Middleton, Donatton & Co.



GEORGE BENJAMIN, OF PHILADELPHIA, PENNSYLVANIA, AND WILLIAM HANDLEY, OF CAMDEN, NEW JERSEY.

PHONOGRAPH-HORN.

No. 917,404.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed August 22, 1903. Serial No. 449,808.

*To all whom it may concern:*

Be it known that we, GEORGE BENJAMIN and WILLIAM HANDLEY, citizens of the United States, residing at Philadelphia, Pennsylvania, and Camden, New Jersey, respectively, have invented certain new and useful Improvements in Phonograph-Horns, of which the following is a specification.

Our invention relates to the production of a horn for use in graphophones or phonographs and is designed especially to overcome the serious objection of the metallic sound common to many horns; to provide a horn very light in weight and at the same time very durable.

In the accompanying drawing is shown in Figure 1 a side view, and in Fig. 2 a sectional view of a horn made in accordance with our invention. Fig. 3 represents a sectional view of a horn having a sound box. Fig. 4 is a detail view of the bridge.

We have found that it is exceedingly difficult to produce a horn which will not interfere in any way with the sound produced by the machine and we have aimed to avoid the metallic or screeching sound common to metallic horns and to also prevent the absorption or flattening of the sound as when any form of wood is used and in our experiments we have discovered that the use of horse hair produces the most perfect tones, provided it is arranged with the strands of horse hair longitudinally of the horn.

In carrying out our invention we utilize an outer lining for the horn, which may be paper as shown at 1, or this may be of silk to give a finish to the exterior of the horn, or we may use silk over the paper, but in all cases the paper is thin for the sake of lightness. Next to the paper or silk exterior, we place the horse hair layer, the strands of the horse hair extending longitudinally of the horn and then in order to protect the horse hair from abrasion we place over it a layer of thin paper, muslin or silk so that while protection may be given to the horse hair layer, the benefit derived from the horse hair or horse hair cloth will not be lost. The end of the horn may be stiffened by a metallic rim as shown at 5. The hair cloth layer is indicated at 2 and the inner layer of paper, silk or muslin at 3. We have found that the hair cloth lining or layer is non-absorbent and does not tend to flatten the sounds, but has a tendency to carry them and to deliver them as they issue from the machine in per-

fect tones. We believe that strands made of animal substances, such as cat-gut, would answer precisely the same purpose, but it would be too expensive to be used and hence we find in the hair cloth a material perfectly answering the purpose and having the merit of economy, as well.

We also provide a sound box in connection with the horn formed as described to increase the volume and purity of tone, this consisting, as shown in Fig. 3 of an outer wall 6 made up of the layers of paper and horse hair, or hair cloth, this wall being laid over a bridge 7, the inner edge of which rests upon the wall of the horn proper. This bridge is preferably of annular form having openings at 8. In front of this bridge and toward the small end of the horn we provide openings 9 through the wall of the horn through which the interior of the sound box or chamber communicates with the interior of the horn for the emission of the sound. These openings are preferably of S shape, similar to those employed adjacent the bridge in a violin, and in fact our sound box produces, in a measure, a violin effect in softening the tones and increasing the volume thereof, the horse hair strings being laid over the bridge and being vibrated by the sound waves to give the desired effect. We do not limit ourselves to the form of bridge or shape of the sound box.

We prefer to build up our horn of a series of tapered strips of material the general form of which is shown in Fig. 3 between the dotted lines 10. The strips of paper and of horse hair cloth are each of this form, *i. e.* tapered to conform to the flare of the horn, and when superimposed they are held together by uniting strips of paper or other material pasted or cemented over the joints of the tapered layers as indicated at 11.

It will be understood that the inner and outer layers are separated from each other by the interposed hair cloth, and the interstices of this hair cloth are free, that is to say, the hair cloth is not embedded in any body or holding material.

What we claim is:—

1. A graphophone horn composed of a plurality of separate layers of material, including a layer of hair cloth, said hair cloth having its interstices free, substantially as described.

2. A graphophone horn composed of a plurality of layers of material, including an

outer lining layer, an inner layer and an interposed layer of hair cloth, said layers of material being separate, and the hair cloth having its interstices free, substantially as described.

3. A graphophone horn composed of layers of material, including a layer of hair cloth laid against the other layer and having its interstices free, the strands of hair running longitudinally or lengthwise of the horn, substantially as described.

4. A graphophone horn having a chamber surrounding the main wall of the horn, with an opening leading into the interior of the horn and closed throughout its outer wall, substantially as described.

5. A phonograph horn having a bridge surrounding its main wall and a chamber surrounding the main wall of the horn, with its outer wall extending over the bridge, substantially as described.

6. A phonograph horn having a chamber surrounding its main wall and with a bridge

therein surrounding the said main wall, with hair cloth extending over the bridge and forming a part of the outer wall, substantially as described.

7. A phonograph horn having a chamber extending around its main wall, said main wall and the outer wall of said chamber each having a layer of hair cloth therein, and an interposed bridge, substantially as described.

8. A phonograph horn composed of inner and outer layers of material separated by a layer of hair cloth.

9. A phonograph horn composed of inner and outer layers of material separated by a layer of hair cloth in which the strands of hair cloth run lengthwise of the horn.

In testimony whereof, we affix our signatures in presence of two witnesses.

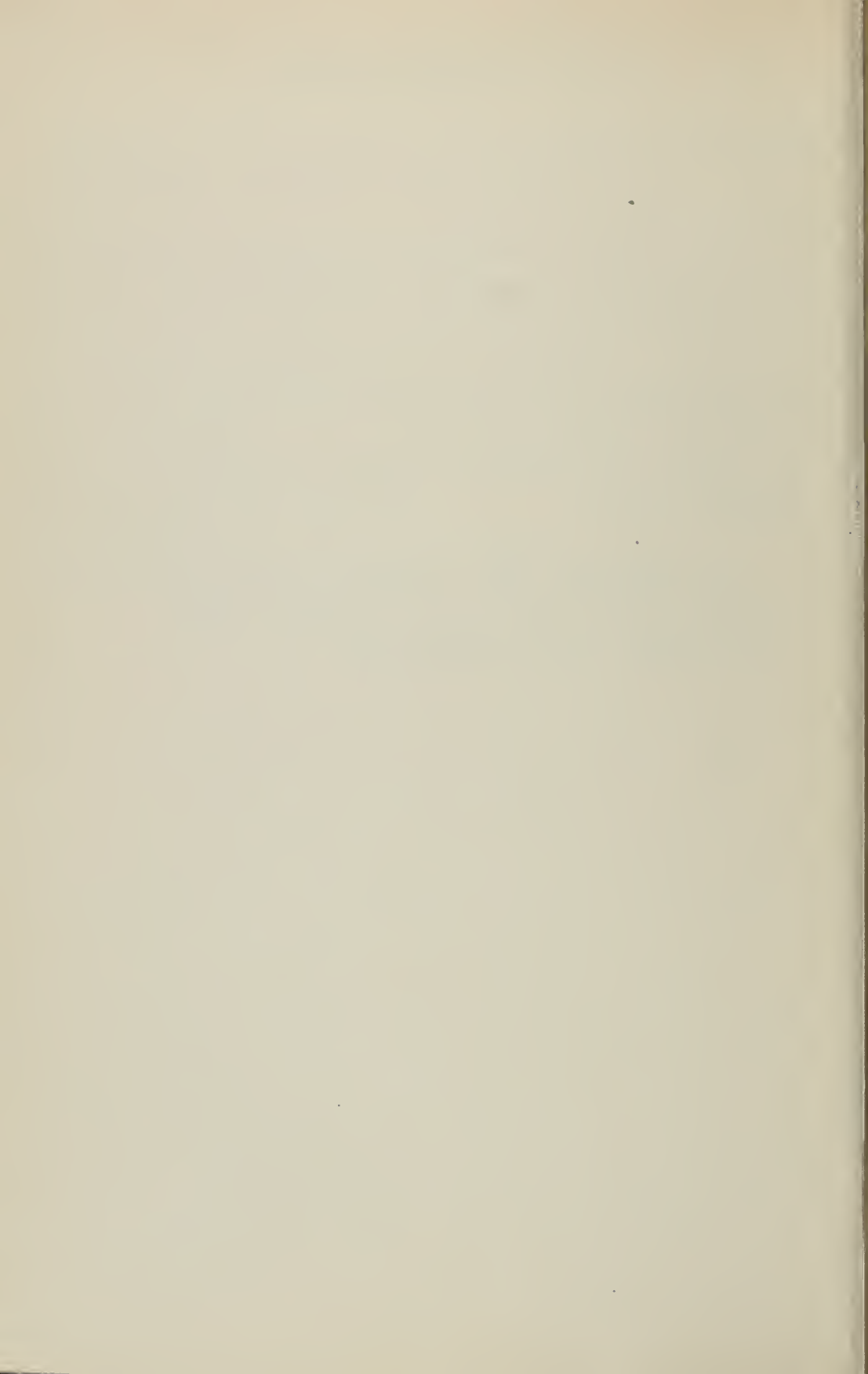
GEORGE BENJAMIN.  
WILLIAM HANDLEY.

Witnesses:

JAMES R. ANDERSON,  
LOUIS D. CASNER.



[Endorsed]: No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Exhibit 48. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



J. A. DANIS.  
METAL HORN.

APPLICATION FILED JAN. 14, 1910:

967,618.

Patented Aug. 16, 1910.

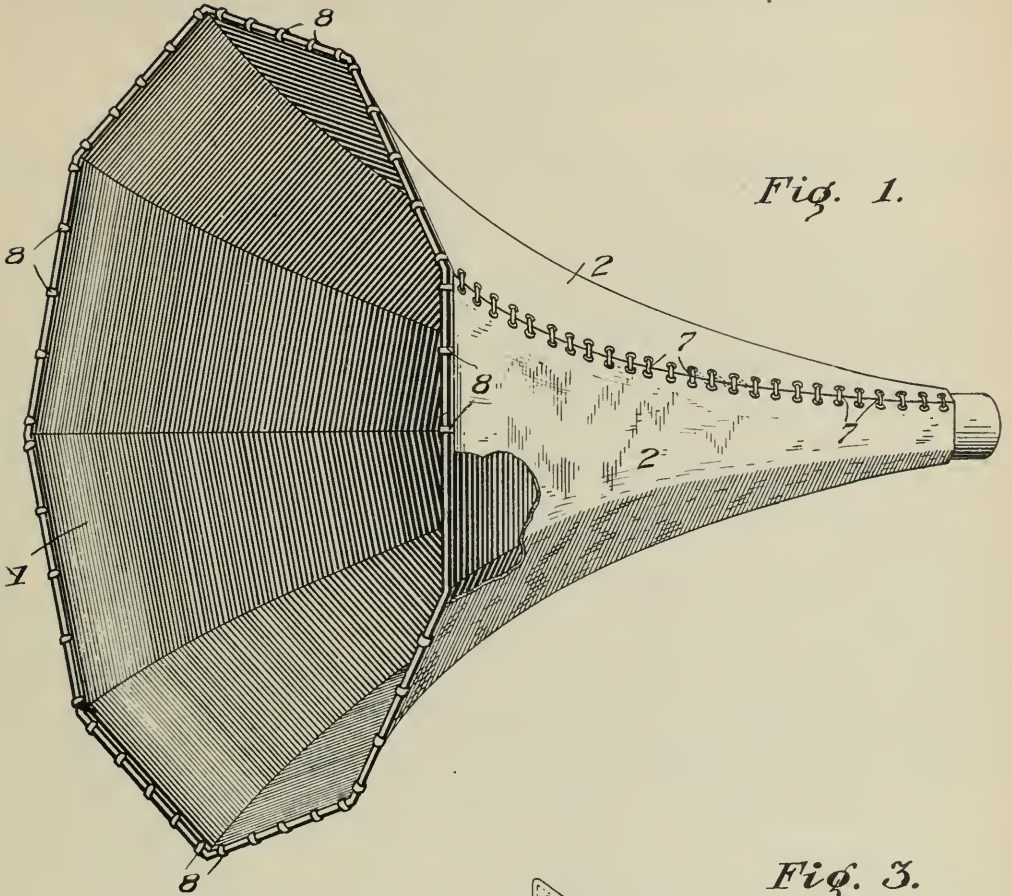


Fig. 1.

Fig. 2.

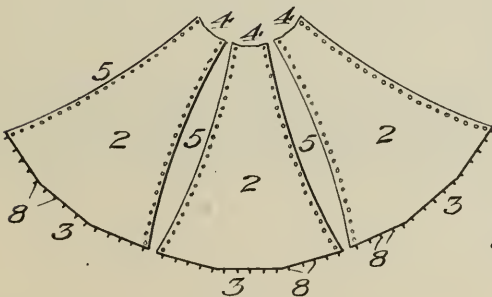
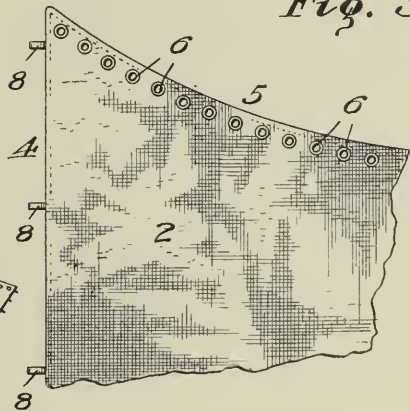


Fig. 3.



Witnesses:  
Edward Danis  
Alphonse C. Demio

Inventor:



# UNITED STATES PATENT OFFICE.

JOSEPH ADELOR DANIS, OF BURLINGTON, VERMONT.

## METAL HORN.

967,618.

Specification of Letters Patent.

Patented Aug. 16, 1910.

Application filed January 14, 1910. Serial No. 538,168.

*To all whom it may concern:*

Be it known that I, JOSEPH ADELOR DANIS, a citizen of the United States, residing at the city of Burlington, in the county of Chittenden and State of Vermont, have invented a new and useful Improvement in Metal Horns, of which the following is a specification.

This invention relates to horns or amplifiers for phonographic apparatus, and its object is to provide means for dampening the vibrations of said horn when made of metal, so that the tone of the instrument will be sweeter and smoother. The means which I use to accomplish this result comprises a cover for the horn made of textile fabric and detachably secured to said horn. To insure a good fit, the cover is made in sections, provided with means for lacing them together, and at its larger end said cover is also provided with hooks which catch over the edge of the metal horn and hold the cover tightly stretched, and in close contact with said horn.

In the accompanying drawing, Figure 1 is a perspective view of a metal horn or amplifier provided with my improved cover. Fig. 2 shows the sections from which the cover is made, and Fig. 3 is a view on a larger scale of one corner of a section showing the eyelets and hooks with which it is provided.

The horn 1 is made of metal in the customary bell-mouthed or flaring shape. The cover is composed of a plurality of sections 2 cut out of textile material. The combined

length of the larger ends 3 of said sections is just sufficient to encircle the mouth of the horn, while the combined lengths of the smaller ends 4 of said sections will just go around the small end of said horn. The edges 5 of the sections are concaved so that the cover will snugly hug the horn throughout its entire length. Along said curved edges the sections are provided with eyelets 6 to receive the lacings 7 by which the sections are held together. When the completed cover is drawn over the horn, the hooks 8 along the large ends of the sections are pulled over the edges of the mouth of the horn, where they are retained by the elasticity of the textile fabric of which the cover is made, so that it will fit closely and smoothly all over the outer surface of the horn. It can be readily removed by disengaging the hooks and slipping it off over the small end of the horn, after removing the latter from the talking machine.

Claim:

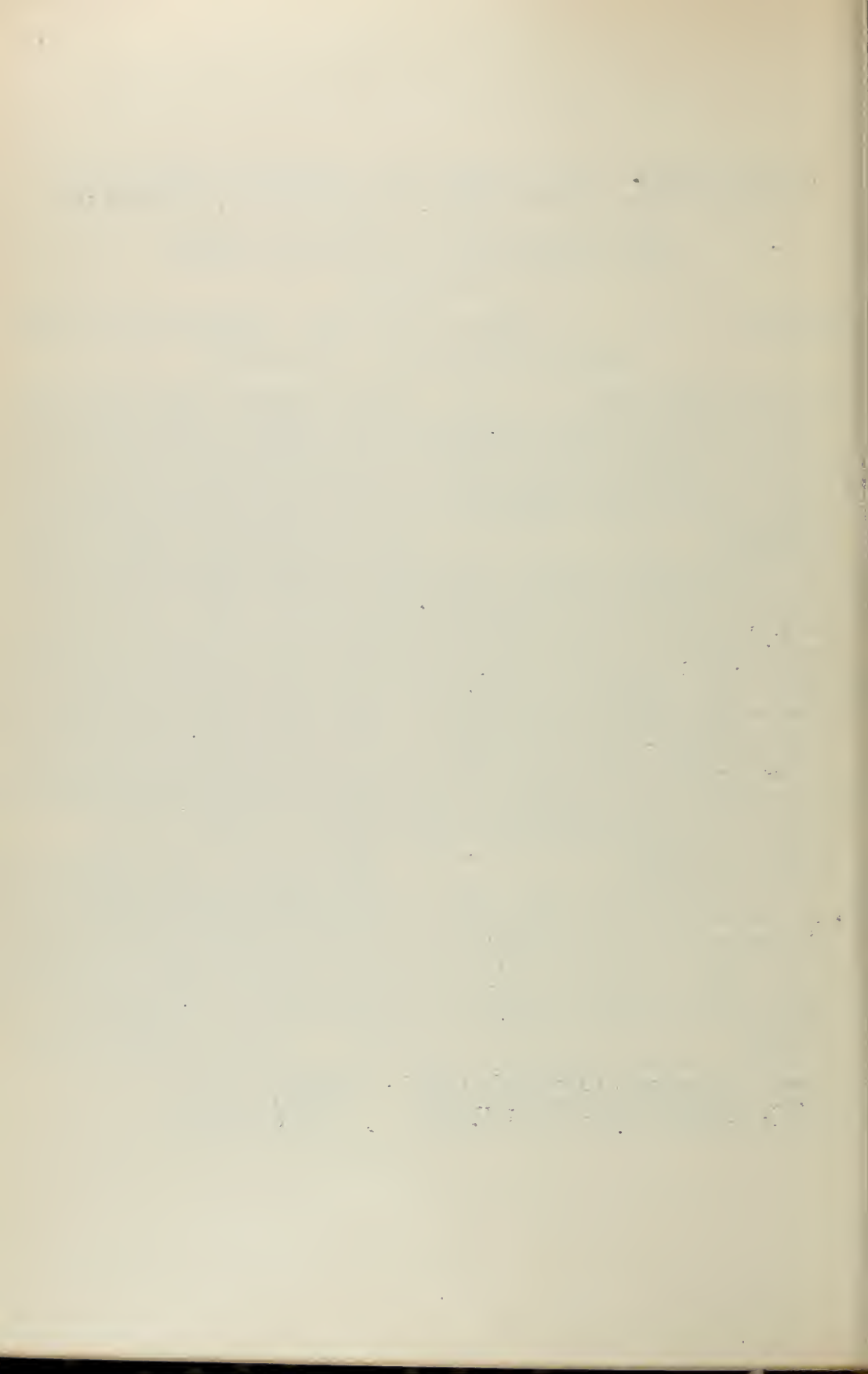
The combination with the metal horn of a talking machine, of a detachable cover of textile material, composed of sections shaped to fit said horn snugly and laced together along their edges, and hooks at the larger end of said cover adapted to be engaged with the edge of the mouth of said horn and retained there by the elasticity of the material.

JOSEPH ADELOR DANIS.

Witnesses:

EDWARD DENNIS,  
ARTHUR DENNIS.





[Endorsed]: No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Exhibit 46. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



## DESIGN.

No. 38,202.

PATENTED AUG. 28, 1906.

C. J. EICHHORN.  
 AMPLIFYING HORN.  
 APPLICATION FILED JUNE 29, 1905.

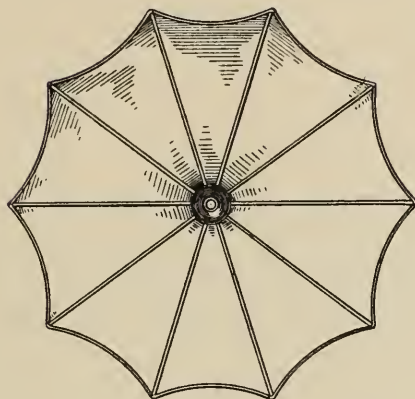


Fig. 1.

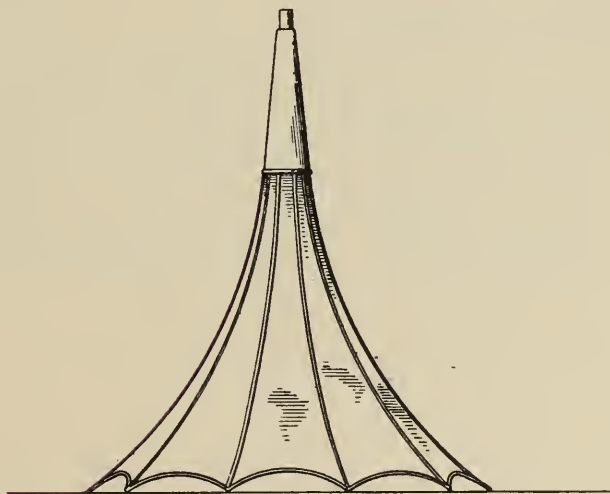


Fig. 2.

WITNESSES:

Ralph Lancaster

Russell M. Everett

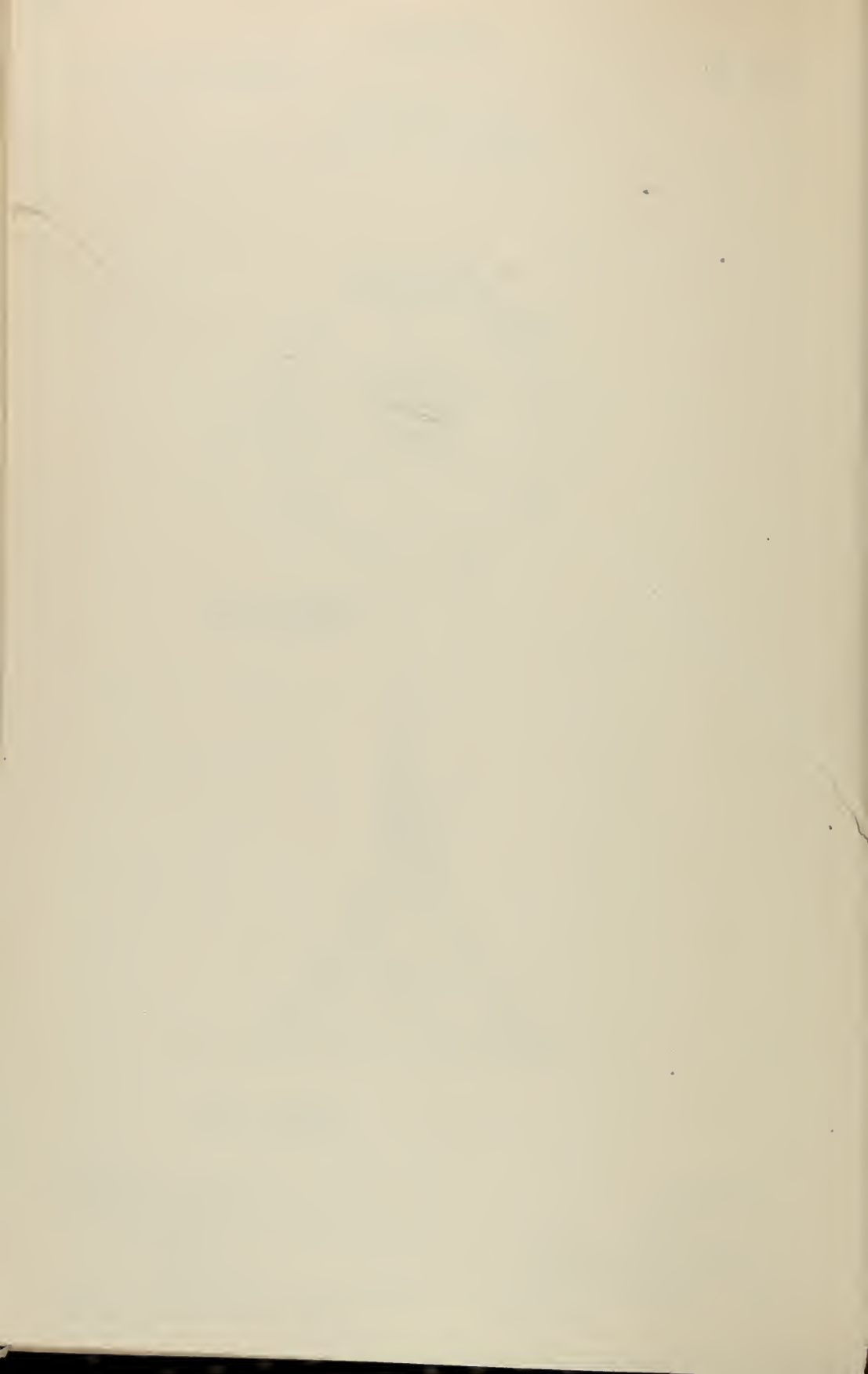
INVENTOR:

Charles J. Eichhorn,

BY

Charles H. Bell,

ATTORNEY.





# UNITED STATES PATENT OFFICE.

CHARLES J. EICHHORN, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE  
TEA TRAY COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION  
OF NEW JERSEY.

## DESIGN FOR AN AMPLIFYING-HORN.

No. 38,202.

Specification for Design.

Patented Aug. 28, 1906.

Application filed June 29, 1905. Serial No. 267,667. Term of patent 14 years.

### *To all whom it may concern:*

Be it known that I, CHARLES J. EICHHORN, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented a new, original, and ornamental Design for Amplifying-Horns, as shown in the accompanying drawings.

In the accompanying drawings, Figure 1 shows in front elevation or large end view an

amplifying-horn of my new and ornamental design, and Fig. 2 is a side elevation of the same.

I claim—

The ornamental design for an amplifying-horn, as shown.

CHARLES J. EICHHORN.

Witnesses:

CHARLES H. PELL,  
CLEMENT BEECROFT.



[Endorsed]: No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Exhibit #41. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



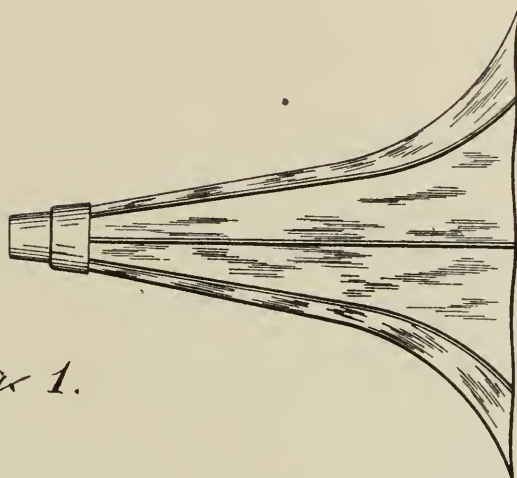
DESIGN.

No. 38,273.

PATENTED OCT. 9, 1906.

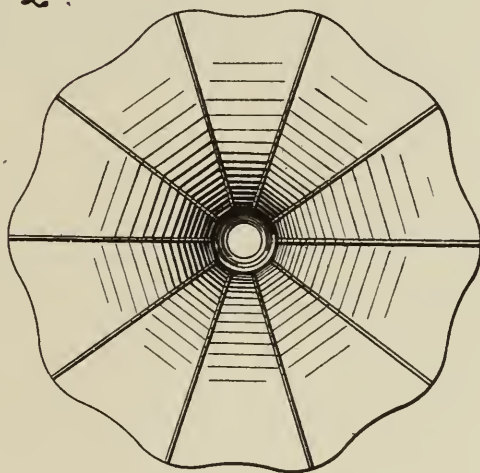
C. BEECROFT.  
HORN.

APPLICATION FILED MAR. 10, 1906.



*Fig. 1.*

*Fig. 2.*



WITNESSES

*Ethel B. Reed*

*F. B. Christiansen*

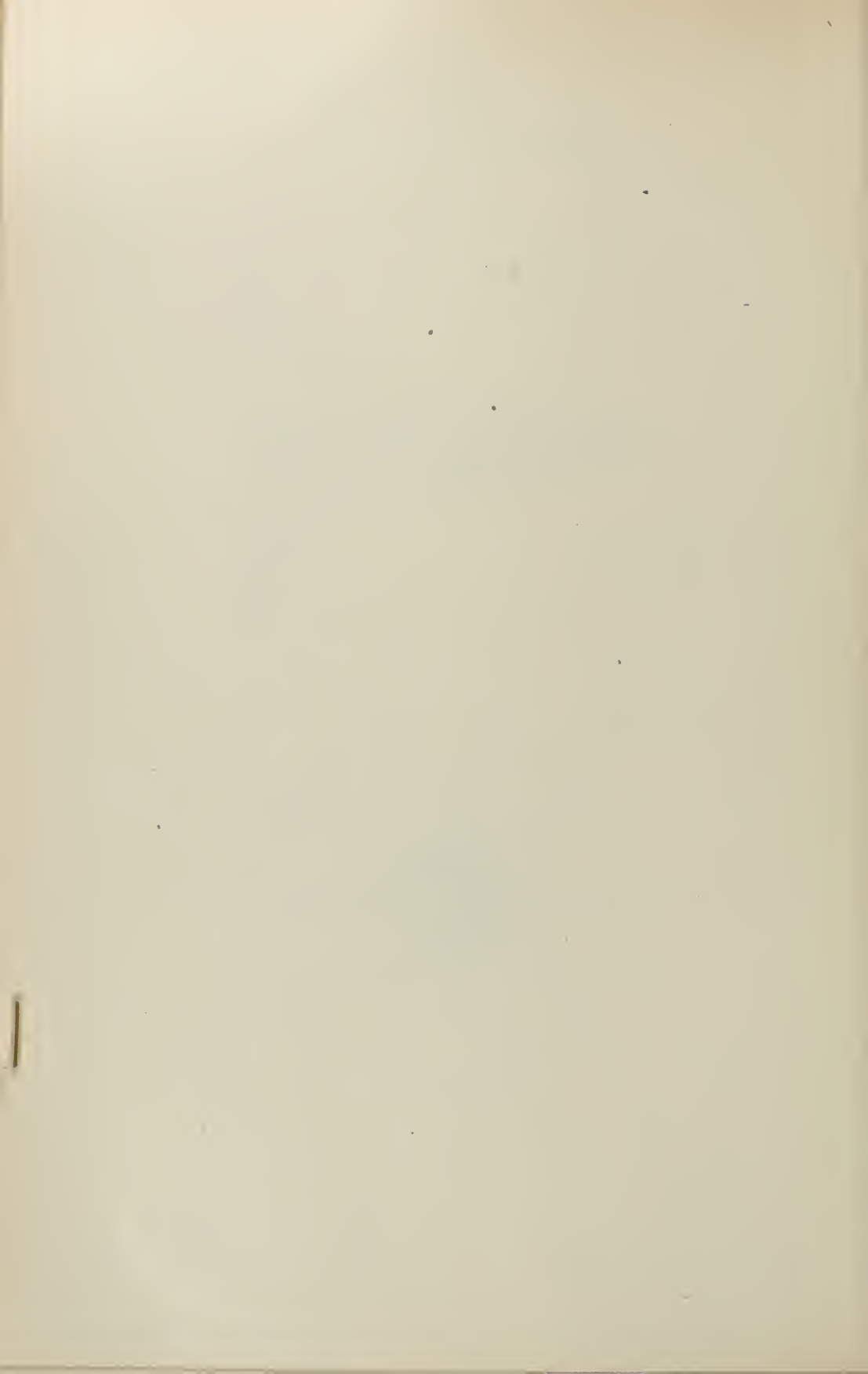
INVENTOR

*Clement Beecroft,*

BY

*Russell M. Everett,*  
ATTY.





# UNITED STATES PATENT OFFICE.

CLEMENT BEECROFT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE TEA TRAY COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## DESIGN FOR A HORN.

No. 38,273.

Specification for Design.

Patented Oct. 9, 1906.

Application filed March 10, 1906. Serial No. 305,411. Term of patent 14 years.

*To all whom it may concern:*

Be it known that I, CLEMENT BEECROFT, a citizen of the United States, residing in the city of Philadelphia, and State of Pennsylvania, have invented a new, original, and ornamental Design for a Horn, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

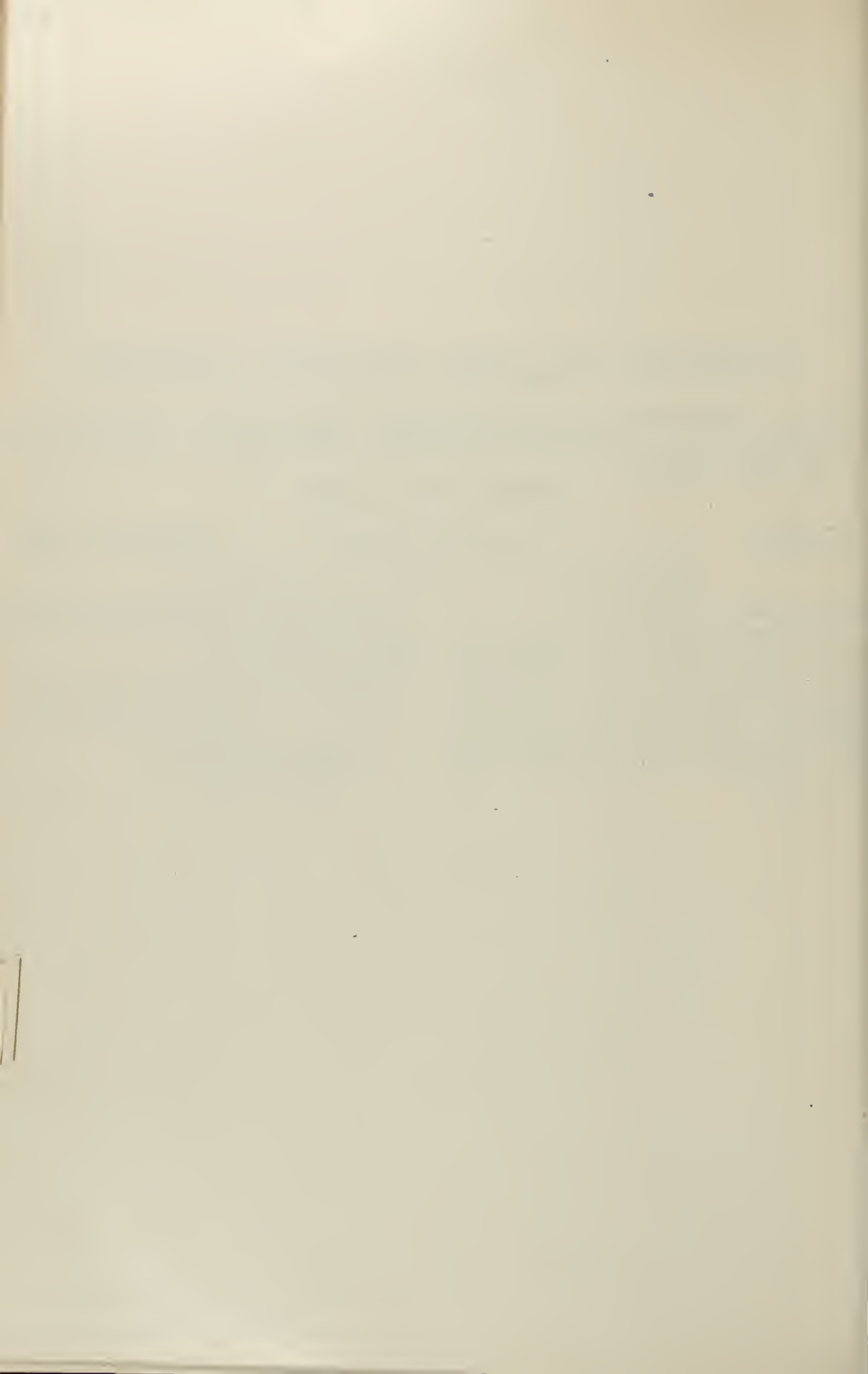
Figure 1 is a side elevation of a horn, showing my new design; and Fig. 2 is view of the large end of the same.

I claim—

The ornamental design for a horn as shown.  
CLEMENT BEECROFT.

Witnesses:

RUSSELL M. EVERETT,  
ETHEL B. REED.



[Endorsed]: No. 2759. U. S. Circuit Court of  
Appeals for the Ninth Circuit. Exhibit No. 42.  
Apr. 8, 1916. F. D. Monckton, Clerk.





# DESIGN.

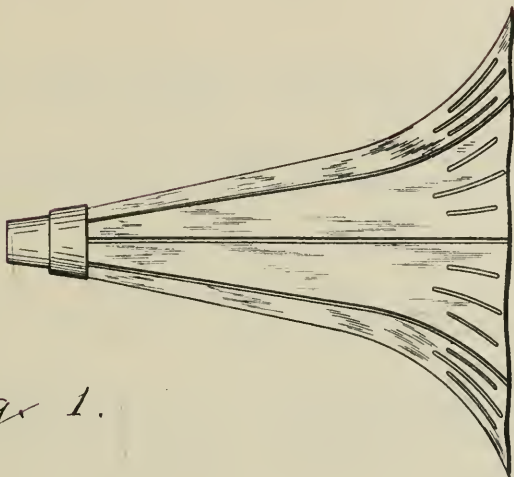
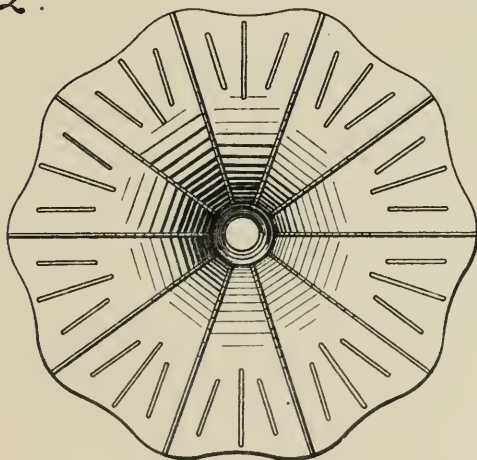
No. 38,274.

PATENTED OCT. 9, 1906.

C. BEECROFT.

HORN.

APPLICATION FILED MAR. 10, 1906.

*Fig. 1.**Fig. 2.*

WITNESSES

*Ethel B. Reed**F. B. Christiansen*

INVENTOR

*Clement Beecroft.*

BY

*Russell M. Everett.*



# UNITED STATES PATENT OFFICE.

CLEMENT BEECROFT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
THE TEA TRAY COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION  
OF NEW JERSEY.

## DESIGN FOR A HORN.

No. 38,274.

Specification for Design.

Patented Oct. 9 1906.

Application filed March 10, 1906. Serial No. 305,412. Term of patent 14 years.

*To all whom it may concern:*

Be it known that I, CLEMENT BEECROFT, a citizen of the United States, residing in the city of Philadelphia and State of Pennsylvania, have invented a new, original, and ornamental Design for Horns, of which the following is a specification, reference being made to the accompanying drawings, forming part thereof.

Figure 1 is a side elevation of a horn, showing my new design; and Fig. 2 is view of the large end of the same.

I claim—

The ornamental design for a horn as shown.  
CLEMENT BEECROFT.

Witnesses:

RUSSELL M. EVERETT,  
ETHEL B. REED.



[Endorsed]: No. 2759. U. S. Circuit Court of  
Appeals for the Ninth Circuit. Exhibit #43. Filed  
———. F. D. Monckton, Clerk.





DESIGN.

No. 38,602.

PATENTED JUNE 4, 1907.

M. STEINER.  
PHONOGRAPH HORN.  
APPLICATION FILED MAY 6, 1907

Fig. 1

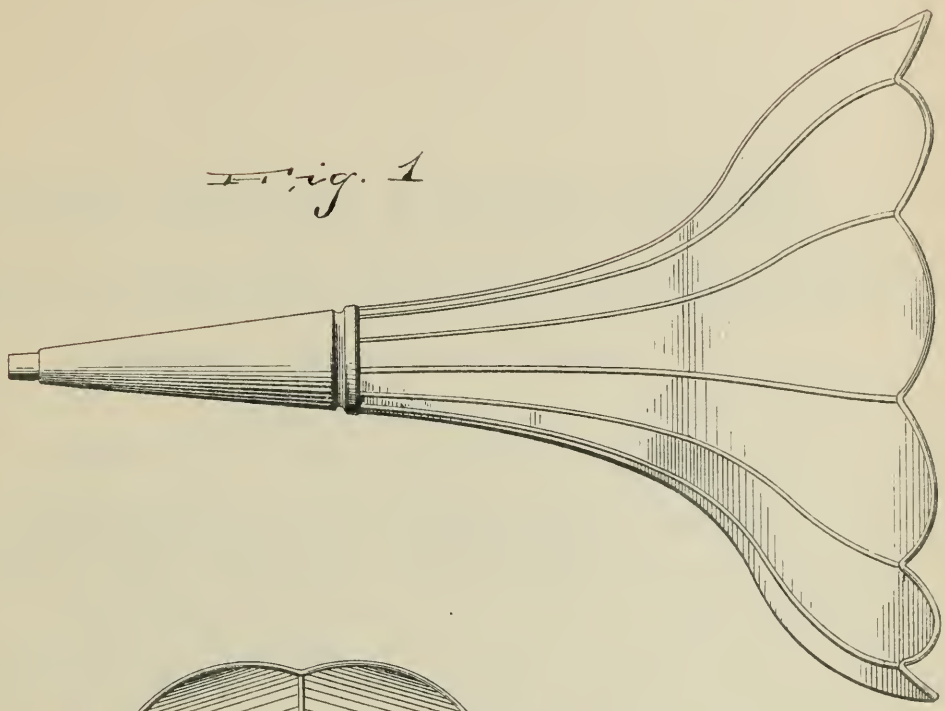
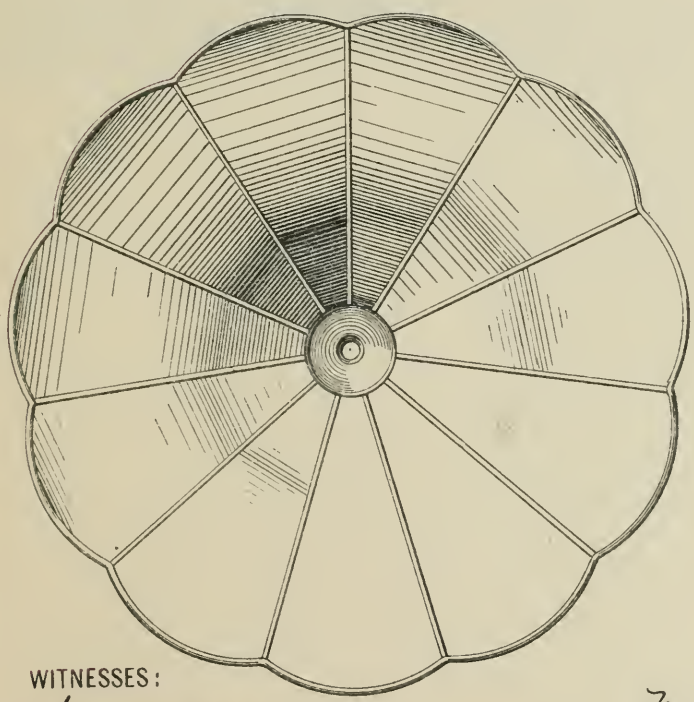


Fig. 2



WITNESSES:

*Henry Kahn*  
*Ralph Lancaster*

INVENTOR

*Max Steiner*  
BY  
*Wm. H. Campfield*  
ATTORNEY



# UNITED STATES PATENT OFFICE.

MAX STEINER, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE NEW JERSEY SHEET METAL CO., OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## DESIGN FOR A PHONOGRAPH-HORN.

No. 38,602.

Specification for Design.

Patented June 4, 1907.

Application filed May 6, 1907. Serial No. 372,290. Term of patent 7 years.

*To all whom it may concern:*

Be it known that I, MAX STEINER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented a new, original, and ornamental Design for Phonograph-Horns, of which the following is a specification, reference being had to the accompanying drawing, forming part thereof.

Figure 1 is a side view, and Fig. 2 is an end view looking from the large end.

What I claim is:—

The ornamental design for a phonograph horn, as shown.

MAX STEINER.

Witnesses:

WM. H. CAMFIELD,  
E. A. PELL.





[Endorsed]: No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Exhibit #45. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



Impr'd Bell

PATENTED

DEC 17 1867

72422

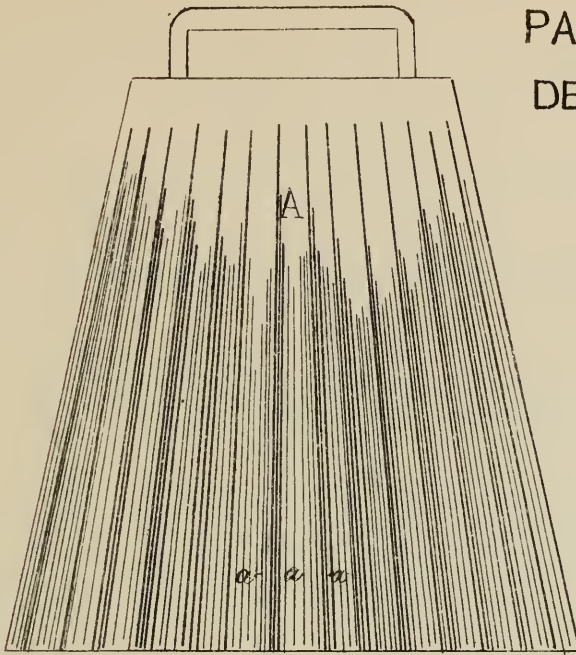


Figure 1.

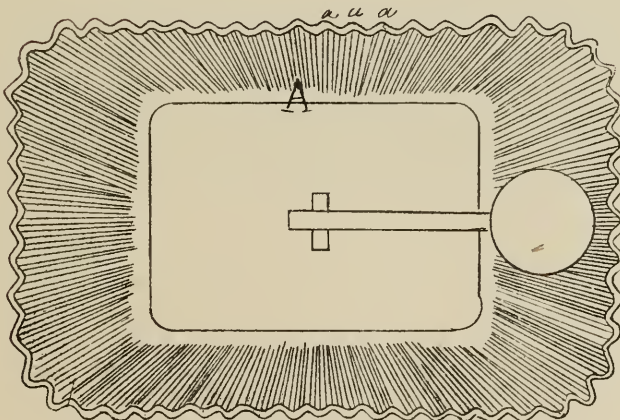


Figure 2.

Witnesses

T. E. WhiteJ. B. des Granges

Inventor.

G. S. Saxton

By his Atty.



# United States Patent Office.

GEORGE S. SAXTON, OF ST. LOUIS, MISSOURI.

*Letters Patent No. 72,422, dated December 17, 1867.*

## IMPROVEMENT IN MANUFACTURE OF CORRUGATED BELLS.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE S. SAXTON, of the city and county of St. Louis, and State of Missouri, have invented a new and useful Improvement in Bells; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to an improvement in bells by corrugating the lower portion of their sides or bodies; the object of which improvement is twofold in its nature: Firstly, it is for the purpose of increasing the tintinnabulary quality of the bell, and the volume of the sound issued therefrom; and, secondly, it is for the purpose of constructing small bells of sheet metal, and of one single piece, the corrugations of the sides of the bell taking up the excess of the metal toward the base, and thus rendering it possible to form a perfect pressed bell of one single piece.

To enable those skilled in the art to make and use my improved bell, I will proceed to describe its construction and operation.

Figure 1 of the drawings is a side elevation of one of the improved bells.

Figure 2 is a bottom plan of the same.

The general form of the bell A may be in any pattern that is best adapted to the purposes for which it is intended. The only feature in which it differs from all other bells is in the corrugations *a*, which commence in large folds near or at the bottom of the bell, and, as they rise, gradually diminish toward the top, at which place they entirely vanish. These folds or corrugations *a* increase the lower or vibratory portion of the bell to such an extent as to very perceptibly increase the volume of sound produced by its agitation. The chief object of the improvement, however, is to form the bell in such a manner that it may be constructed by pressing, with suitable dies, a single sheet of metal into the proper form. This of course is confined to small bells, and the result is to produce a better bell at a cheaper price. The depth of the bell of course precludes the idea of pressing a bell into the proper form without taking up the excess of metal in this manner.

Having described my invention, I claim as a new article of manufacture—

The bell A, when it is formed in corrugations, substantially in the manner and for the purpose set forth.

GEORGE S. SAXTON.

Witnesses:

M. RANDOLPH,

T. E. WHITE.





[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cal. Dfts. Exhibit "A." Oct. 2, '12. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "A." Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "A." Filed Apr. 8, 1916. F. D. Monckton, Clerk.



No. 165,912.

Patented July 27, 1875.

FIG. I.

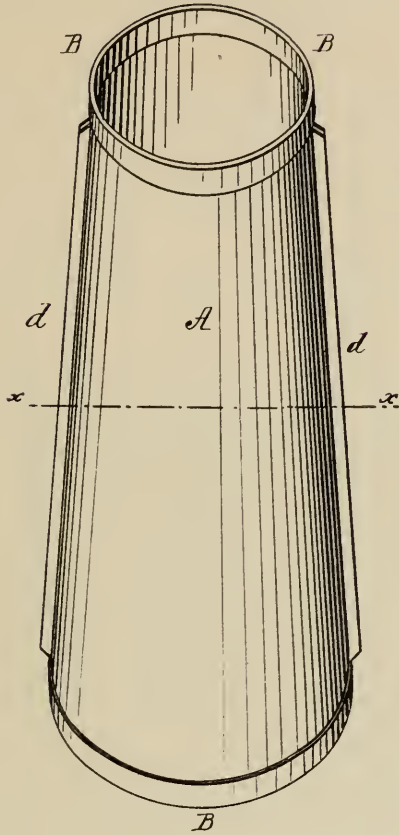


FIG. III.

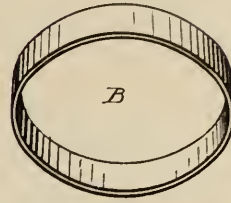


FIG. II.

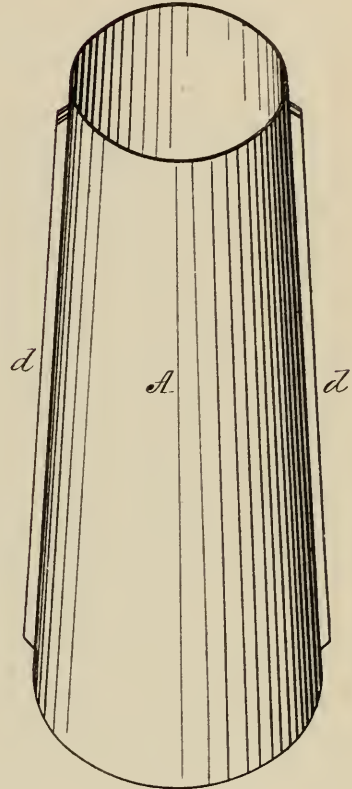


FIG. V.

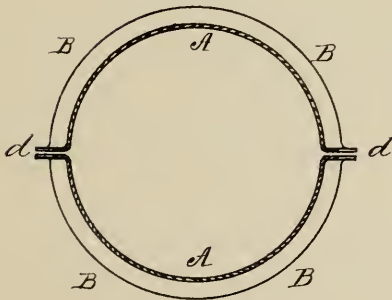
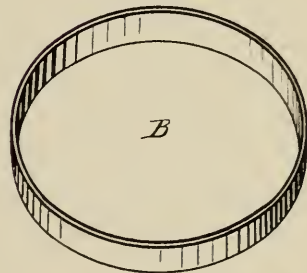


FIG. IV.



WITNESSES:

J. S. Coombs  
W. H. Norris

INVENTOR

William H. Barnard

By James L. Norris

Atty





# UNITED STATES PATENT OFFICE.

WILLIAM H. BARNARD, OF SEDALIA, MISSOURI.

## IMPROVEMENT IN LAMP-CHIMNEYS.

Specification forming part of Letters Patent No. **165,912**, dated July 27, 1875; application filed January 4, 1875.

*To all whom it may concern:*

Be it known that I, WILLIAM H. BARNARD, of Sedalia, in the county of Pettis and State of Missouri, have invented certain new and useful Improvements in Lamp-Chimneys, of which the following is a specification:

My invention relates to certain improvements in that class of lamp-chimneys which are constructed of two longitudinal sections, united at their edges, and properly bound or clasped together, for the purpose of allowing for the expansion and contraction of the glass when subjected to sudden changes of temperature, and preventing the chimney from cracking or breaking.

The object of my invention is to secure a more perfect joint at the point of union of the two sections, and provide a more secure and reliable device for binding the two sections together, than has been heretofore accomplished in the chimneys of this class, as ordinarily constructed; and my invention consists in constructing a chimney of two longitudinal sections or parts, as usual, each section having a longitudinal flange on its edges, which unite and form a longitudinal projection or edge on the outside of the chimney when the sections are bound together.

By this construction a broad face is obtained along the edges of each section, which form, when properly ground and placed together, a perfect joint.

In the drawings, Figure 1 is a perspective view of my improved lamp-chimney; Fig. 2, a similar view of the same with the end ferrules removed. Figs. 3 and 4 are detached views of the top and bottom ferrules, respectively; and Fig. 5 is a section on line *xx* of Fig. 1.

The letters A A represent the sections composing the chimney. Along the edges of each section, on the outside, a longitudinal flange, *d*, is formed. The faces of these flanges

are accurately ground, so as to form a perfectly tight joint when the sections are joined together. The flanges do not extend quite to the end of the sections, but terminate a short distance from said ends, in order to allow the sections to set into the annular ferrules which bind them together. These annular ferrules are represented by the letters B B. They are constructed so as to grasp the edges of the sections at their ends, both on the inside and outside, and thus firmly bind them together.

It will be seen that by the above-described construction of the sections a broad face will be formed along the edges of the sections at the point of union, which will allow said edges to be readily and accurately ground, forming a perfect joint throughout the entire length of the sections, which it has hitherto been found impossible to obtain.

The annular ferrules, by grasping both the outside and inside of the chimney, will prevent any slipping of the sections, and thus necessarily bind them in place.

The chimneys thus constructed are admirably adapted for packing for transportation, as the sections will nest together, occupying but little room.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

A lamp-chimney constructed of two sections, each of which is provided with laterally-projecting flanges, substantially as described, whereby, when the sections are placed together, a longitudinal projection is formed and a perfect joint secured, as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

WILLIAM H. BARNARD. [L. S.]

Witnesses:

J. HALL BROWNE,

J. S. JACKSON.



[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cal. Dfts. Exhibit "E." Oct. 2, '12. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "E." Received Aug. 19, 1913. F. D. Monckton, Clerk.

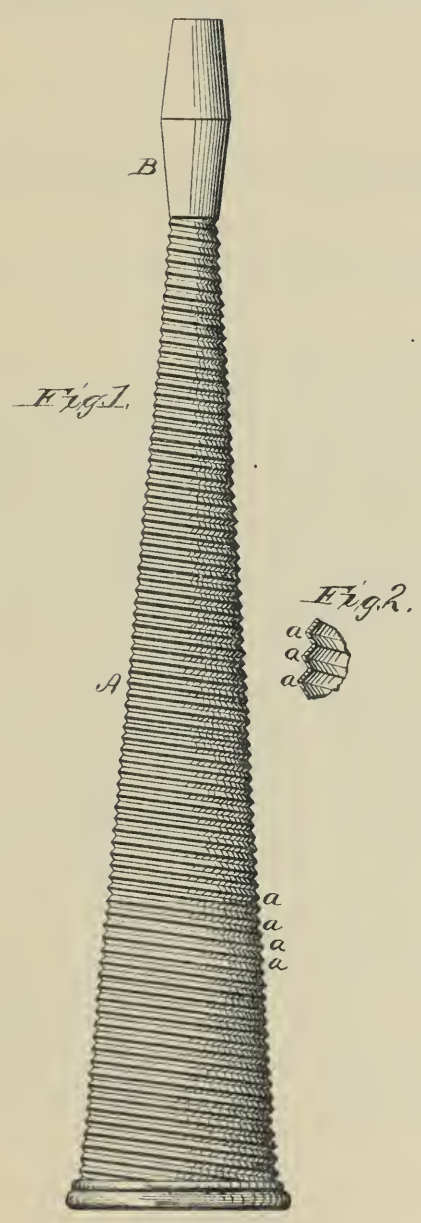
No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "E." Filed Apr. 8, 1916. F. D. Monckton, Clerk.



C. W. FALLOWS.  
TOY BLOW HORN.

No. 181,159.

Patented Aug. 15, 1876.



WITNESSES  
*Frank L. Quinlan*  
*C. L. Cook*

INVENTOR  
*Chas. W. Fallows*  
By *Alfred Mason*  
Attorneys





# UNITED STATES PATENT OFFICE.

CHARLES W. FALLOWS, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN TOY BLOW-HORNS.

Specification forming part of Letters Patent No. **181,159**, dated August 15, 1876; application filed June 27, 1876.

*To all whom it may concern:*

Be it known that I, CHARLES W. FALLOWS, of Philadelphia, in the county of Philadelphia, and in the State of Pennsylvania, have invented certain new and useful Improvements in Sheet-Metal Blow-Horns; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction of a blow-horn, as hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to manufacture and use the same, I will now proceed to more fully describe the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a side elevation of my blow-horn, and Fig. 2 represents a small section of the body.

The body A of the horn is made of corrugated sheet metal, in the usual tapering form, and is provided with a mouth-piece, B, having the usual reed. The metal which forms the body is cut in proper shape, and then passed between rollers or dies and crimped or corrugated. These corrugations are preferably

made on an incline, so that when the blank sheet is bent into tubular shape the corrugations *a a* will be on a short spiral, as shown in the drawings.

It is well known that the thinner the metal of which such horns are made the sharper the tone; but in cases where the horns are plain or smooth, and made of light metal, they do not have the requisite strength or keep proper shape, and in a short period would not be merchantable or present a neat appearance.

I claim for my invention that lighter and cheaper metal can be used, and that the same is more easily worked into proper shape by being light, that it costs less in construction, and that the sound made by the mouth-piece and reed is sharper than in the usual blow-horn made of plain or smooth metal.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

A blow-horn made of corrugated sheet metal, for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of June, 1876.

CHARLES W. FALLOWS.

Witnesses:

JAMES FALLOWS,

ANSON EATON.



[Endorsed]: District Court of the United States, in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co. vs. Sherman, Clay & Co. Defendant's Exhibit Fallows Patent. Alexander Park, Notary Public.

Filed Jul. 27, 1914, W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit Fallows Patent. Filed Apr. 8, 1916. F. D. Monckton, Clerk.





(No Model.)

C. R. PENFIELD.

METALLIC BARREL.

No. 362,107.

Patented May 3, 1887.

Fig. 1.

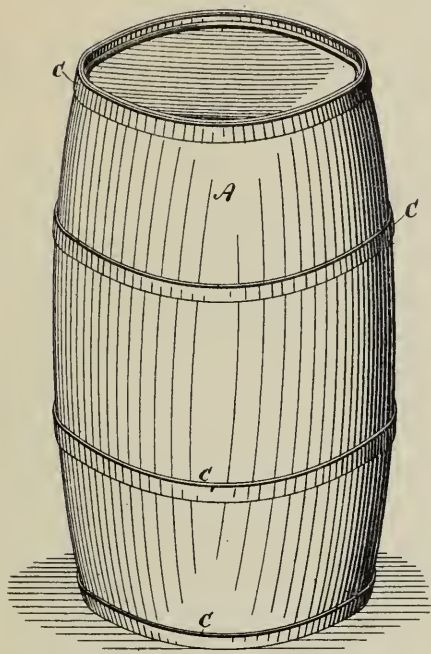


Fig. 2.

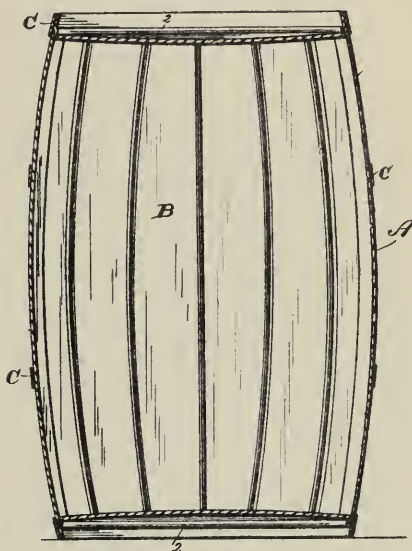


Fig. 13.

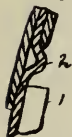


Fig. 3.

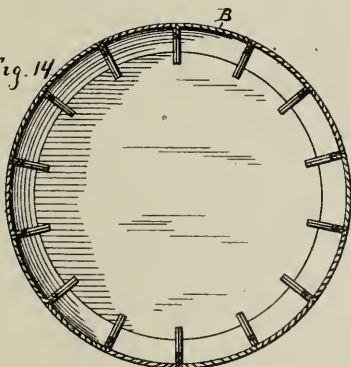


Fig. 14.

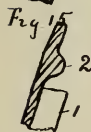
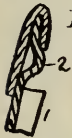


Fig. 11.

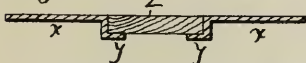


Fig. 12.

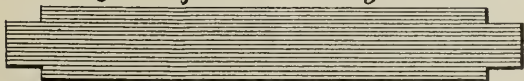


Fig. 4.

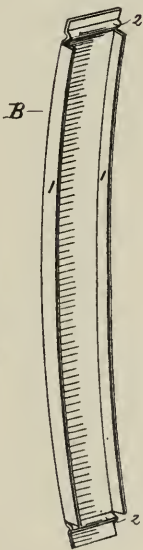


Fig. 5.

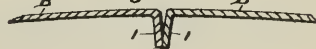


Fig. 6.



Fig. 7.

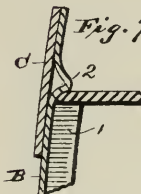


Fig. 8.

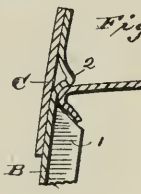


Fig. 9.

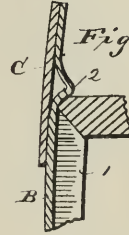
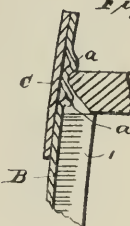


Fig. 10.



Witnesses.

Chas. R. Burr.

Asst. Secy.

Inventor.

Charles R. Penfield  
by Chas. & Chas.  
his Attorneys.



# UNITED STATES PATENT OFFICE.

CHARLES R. PENFIELD, OF ROCHESTER, NEW YORK.

## METALLIC BARREL.

SPECIFICATION forming part of Letters Patent No. 362,107, dated May 3, 1887.

Application filed September 2, 1886. Serial No. 212,510. (No model.)

*Which it may concern:*

It known that I, CHARLES R. PENFIELD, of Rochester, in the county of Monroe and of New York, have invented certain new useful Improvements in Metallic Barrels; and do hereby declare the following to be a clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, to the figures and letters of reference indicated thereon.

My invention has for its object to provide a strong and storing barrel constructed of metal that shall resemble in appearance the ordinary wooden barrel, but shall be much lighter, and altogether more desirable, whether used as a receptacle for liquids or a dry or "slack" barrel; and it consists in a barrel constructed of metallic staves fashioned somewhat after the manner of wooden staves and fastened together, preferably, by hoops, or which may be soldered, or hooped and galvanized, if desired; and it further consists in certain novelties of construction and combinations of parts, which will be hereinafter fully described, and pointed out in the drawings at the end of this specification.

In the drawings, Figure 1 is a view of a barrel constructed in accordance with my invention; Fig. 2, a longitudinal and Fig. 3 a cross section of the same. Fig. 4 is a perspective view of one of the staves; Figs. 5 and 6, views of the joints between the edges of the staves; Figs. 7, 8, 9, 10, and 11, views of modifications of the croze and means of fastening the heads of the staves; and Fig. 12 a view of the stave-blank. Figs. 13, 14, and 15 are views exhibiting various means of strengthening the chine.

Similar letters of reference in the several figures indicate the same parts.

Figure 1 represents a barrel constructed in accordance with my invention, resembling, as far as its external appearance is concerned, an ordinary wooden barrel, constructed of the staves B, fastened together by means of hoops C, as is usually done.

The staves B are made from a blank of sheet metal, preferably steel, such as shown in Fig. 1, the side flanges, 1 1, being forced by the pressure of the hoops into the shape shown in Fig. 1, at which time, they are bent transversely to give

the requisite amount of bilge, and then are given a slight longitudinal bending, so as to strengthen them sufficiently, and also to give the barrel which they are to form the proper rotundity. At the same or another operation the side flanges, 1 1, are bent up to nearly right angles with the body of the staves. Corrugations or ribs 2 2 are next formed near the ends of the blank, a short distance beyond the ends of the side flanges, and this space between the corrugations and the ends of the flanges forms the croze, as will be further explained. These bending operations, though described *seriatim*, are, it will be understood, to be performed by one operation by some powerful pressing device—such, for instance, as a hydraulic press—suitable dies of course being employed to accomplish the purpose. The stave thus constructed, it will be seen, is very stout, and by reason of the several arches and projecting flanges is able to stand any amount of hard usage without losing its shape.

Now, in order to form a barrel from the above staves it is only necessary to set them up with the flanges 2 2 in contact with those of the next stave, and then to place the hoops on and drive them to their proper positions, after the manner of making ordinary wooden barrels.

As the flanges at the side of the staves have a broad bearing upon each other, they are effectually prevented from slipping by, and will therefore act in the same manner as ordinary wood staves. If desired, instead of having the flanges come close together, as shown, they may be bent slightly either inward or outward, as shown in Figs. 5 and 6—in the latter case to give elasticity to the barrel or to permit of applying some sealing material to the cracks thus formed, or in the former case to permit of sealing or galvanizing on the inside and permitting the galvanizing material to fill the crevice formed therein.

The manner of forming the croze and attaching the head may be varied in many ways, as may also the construction of the head. For instance, a plain metal head without flanges (such as shown in Fig. 7) might be employed, in this case the edge of the metal disk being confined between the corrugation and the ends of the flanges 1 1, the ordinary hoop being ap-



plied to the outside of the staves, pressing them inward and strengthening the chine, as shown; or, if desired, a concavo-convex head might be employed having a flange around it, as shown in Fig. 8, adapted to be confined in a manner similar to the device shown in Fig. 7, but having the projecting flange turned down.

In Fig. 9 I have shown the tops of the flanges on the staves inclined, forming the under side of the croze inclined and a wooden head applied thereto, and this device may be used in connection with a head composed partly of wood and partly of metal, *x x*, the two side pieces of metal being provided with flanges *y y*, projecting beneath the wooden piece *z*, as shown in Fig. 11, and they may be provided with upwardly or downwardly projecting flanges adapted to fit the croze.

In Fig. 10 I have shown a double corrugation or two ribs, *a a*, on the end of the stave, the groove between them constituting the croze, and this construction I regard as a particularly good one, because it relieves the ends of the longitudinal flanges *l l* of all pressure upon them.

Barrels constructed as above may be used for liquids, in which event I propose to line them with some form of cement in order to make a tight joint between the staves, or to galvanize them, so as to render them non-corrosive, and also to fill the insides of the seams with the galvanizing material; or I also propose to use them for dry substances, in which case the barrel can be formed, in the usual manner, without the use of cement or galvanizing material, the hoops being relied upon to fasten the whole together, and when thus used one of the flanges *l* may, if desired, be dispensed with, a tight joint being made by one flange with the plain edge of the next stave.

The barrel as a whole is much stronger and lighter than the wooden barrels ordinarily in use, and is practically indestructible. The staves individually are much stronger by reason of the bracing and arching, and, further more, it can be used as a "knockdown" barrel when used for dry or semi-liquid materials, the spring in the metal flanges serving to preserve a practically tight joint between the staves. There are no seams or corrugations on the outside of the barrel, and nothing to prevent its being rolled and manipulated after the manner of ordinary barrels.

The chine may be strengthened by a band of metal extending around the inside, if desired,

as shown in Fig. 13, or by employing an end hoop with an internally-projecting flange, as in Fig. 14, and the end of the staves may, if desired, be strengthened by forming a solid rib in lieu of the corrugation *l l* for forming the croze, as in Fig. 15.

Various modifications will at once suggest themselves to those skilled in the art, and therefore I do not desire to be confined to the exact construction herein shown.

I claim as new—

1. The herein-described barrel, consisting of the metallic staves having the corrugations at their ends and the flanges at the sides, and the hoop or hoops for securing them together, substantially as described.

2. The herein-described barrel, consisting of the metallic staves curved so as to form the bilge, having the corrugations at their ends and the flanges at the sides, and the hoops for securing them together, substantially as described.

3. The herein-described barrel-stave, constructed of sheet metal bent transversely so as to form the bilge, and having the inwardly-turned flange at the side and the corrugations or ribs at the ends, substantially as described.

4. The herein-described barrel-stave, constructed of sheet metal bent transversely so as to form the bilge, and having the inwardly-turned flanges on both sides thereof, and the corrugations or ribs at the ends, substantially as described.

5. The herein-described barrel-stave, constructed of sheet metal bent transversely so as to form the bilge, having the flanges at the sides and the corrugations at the ends forming a portion of the croze, substantially as described.

6. The herein-described barrel-stave, constructed of sheet metal, having the flanges at the sides, terminating a short distance from the ends, and the corrugations at the ends, co-operating with the ends of the flanges to form the croze, substantially as described.

7. The herein-described barrel, constructed of sheet-metal staves, bilged as shown, having the flanges at the sides, the corrugations at the ends, forming with the ends of the flanges the croze, the sheet metal heads, and the hoops for securing the whole together, substantially as described.

CHARLES R. PENFIELD.

Witnesses

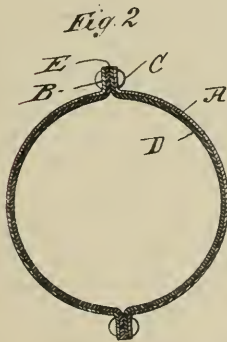
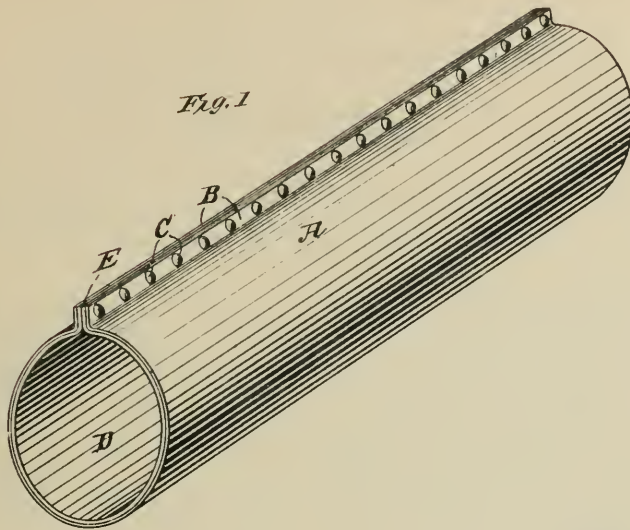
DE L. CRITTENDEN,  
W. D. ARMATAGE.

(No Model.)

J. C. BAYLES.  
PIPE OR TUBE.

Patented July 2, 1889.

No. 406,332.



*Fig. 3*



*Fig. 4*



*Fig. 5*

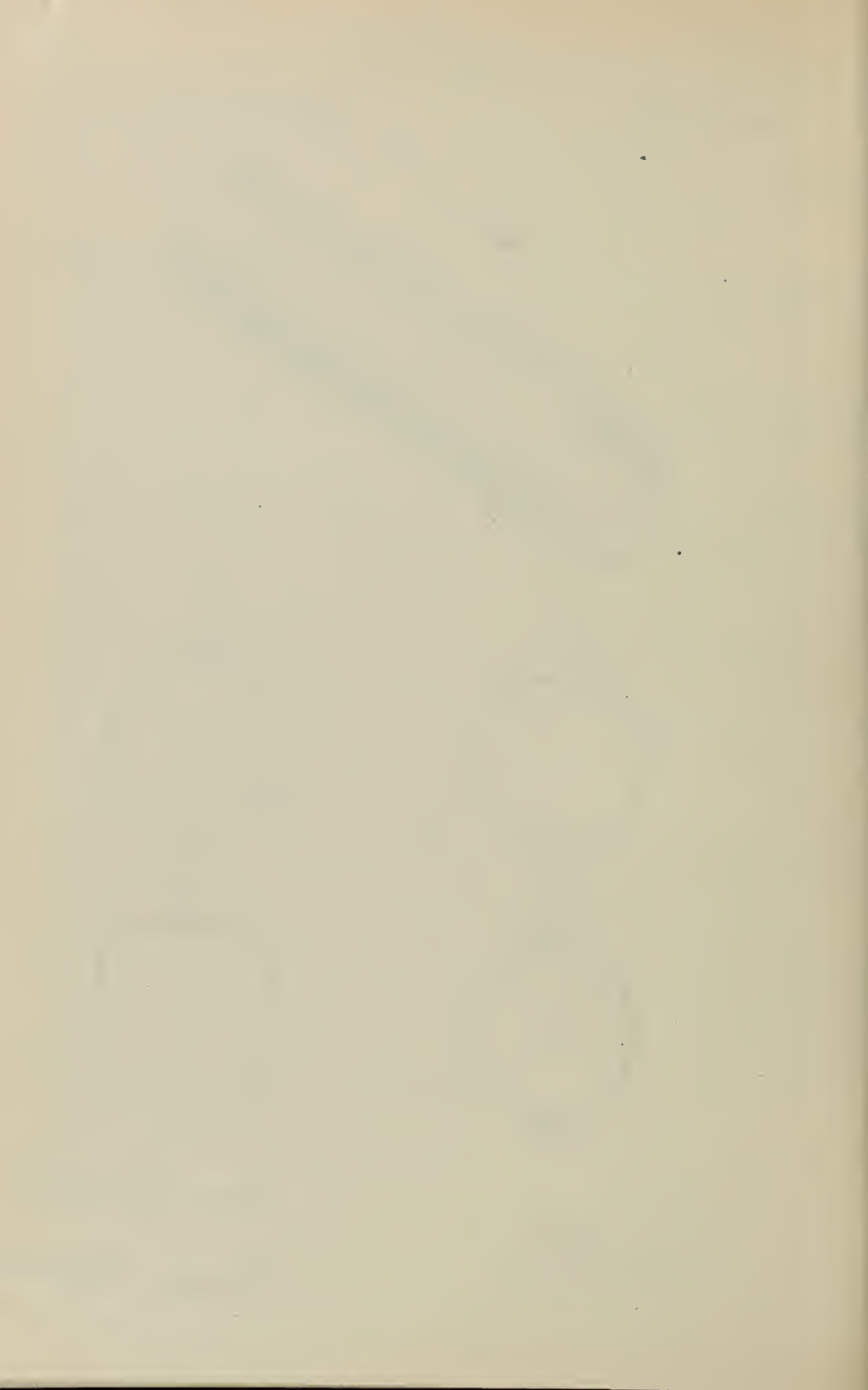


Witnesses:

Raphael Netter  
Robt. F. Gaylord

*Jas. C. Bayles* <sup>Inventor</sup>

by *Duncan Curtis & Co.*





# UNITED STATES PATENT OFFICE.

JAMES C. BAYLES, OF NEW YORK, N. Y.

## PIPE OR TUBE.

**SPECIFICATION** forming part of Letters Patent No. 406,332, dated July 2, 1839.

Application filed April 6, 1889. Serial No. 306,167. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES C. BAYLES, of the city, county, and State of New York, have invented certain new and useful Improvements in Pipes or Tubes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The present invention relates to the construction of pipes or tubes, and especially to that class of pipes that are adapted to conducting acidulous or other iron-destroying liquids. Thus in mining and similar operations it is found that much of the water that it is necessary to drain or draw off is more or less impregnated with sulphur or other elements that render it corrosive in its action upon metal pipes which usually are made of iron.

Heretofore it has been customary to a limited extent to use pipes made of wood or similarly non-corrosive material; but this kind of pipe is obviously impracticable in various respects. It is difficult to make, as well as expensive, especially in large sizes and in regions where there is little timber. It is cumbersome to handle and does not well serve where a water-tight pipe is needed.

It is therefore the object of the invention to produce a metal pipe which shall be capable of resisting the action of the iron-destroying fluids; and the invention consists of a pipe made up from sheet-iron and provided with a lining or sheathing of lead.

Referring to the drawings, Figure 1 shows a section of pipe embodying the invention and having but one seam. Figs. 2 to 5 are cross-sections of modified forms.

Referring to these views in detail, A represents the exterior or body part of the pipe. This body is composed of sheet-metal blanks, which is brought into cylindrical form by any suitable means, with outwardly-projecting flanges B along its longitudinal edges. These flanges are brought opposite each other and then secured together by the rivets C, or any other suitable form of connection—that is to say, bolts or screws may be used, or even any form of suitable clamp—and in the case of very thin metal the flanges may be made to clasp each other or lock together.

the entire inner surface of the metal body A. This lead lining will usually be of a thin gage, and before the seam parts of the iron body of the pipe are closed finally together the sheet of lead will be inserted in such body and worked down to conform to substantially the same form—that is, so as to lie closely on the inner surface of the sheet-iron. Of course the sheet-lead may be shaped with the body of the pipe when this is practicable, and still other ways of placing the lining within the body of the pipe and conforming it thereto will occur to those familiar with the art of pipe-making. This lead sheathing is to be flanged similarly to the blank of the body part, and the flanges E thus formed are to be brought together face to face and secured to and between the flanges B of the iron body. Thus the seam of the pipe as a whole consists of four thicknesses and forms a rib or wing extending outwardly from the surface of the pipe, which serves to stiffen and strengthen the pipe and exposes the junctional parts of the seam for easy manipulation in case of repair of leaks or ruptures.

It is essential in the construction of this pipe that the interior sheathing be secured between the flanges of the iron body. Not only is a tight seam readily formed, but the lining is held against collapsing or being forced away from the surface of the iron. Thus, as is well understood, the lead lining under the action of heat will expand and stretch, but it will not when subsequently cooled contract and return to its previous form, and the effects of long-continued expansion and contraction of the iron body of the pipe will tend to corrugate the lining and to force it away from contact with the inner face of the pipe, as well as to rupture it or cause it to collapse; but when the lining is attached to the body of the pipe the distortion of the lead lining is practically obviated, for the lining will be held against moving away from the iron. Where pipe of but a single seam is used, the pipe should be laid with the seam uppermost, so that the lining will be positively held up by the iron body, and not alone by virtue of the strength of its own arch, for then the action of contraction and expansion, which would be most exerted in the arch, will have

Fig. 2 shows a form of pipe having two seams, but in other respects it is the same as the pipe of Fig. 1. Fig. 3 is another similar form of pipe composed of three sections and having three seams.

It is expected that the most available form of pipe would be one having two or more seams, as the sections of such a pipe may be most conveniently bunched and shipped from the factory to the place of use, where the sections may be secured together in pipe form. So, too, with such pipe, the separate sections are so nearly flat that it is a simple matter to apply the lead linings to them, which may very readily be done at the time of assembling them into pipe form. The lead in thin sheets would have but to be laid in the sections and could be quickly shaped thereto by mallets or other simple hand-tools, and in case the run of water does not fill the pipe, or does so rarely, then only the lower or underneath section or sections need be lined.

In Fig. 4 I show the seams provided with re-enforce pieces F, which are angle-bars lying in the angles of the seams, and are employed where a strong pipe is needed and the rigidity and strength of the seam parts is a matter of importance. These re-enforce bars may be of any other suitable form, or they may be of a single piece instead of separate strips located upon opposite sides of the seam and adapted to inclose the seam parts.

Fig. 5 shows one form of flat-sided pipe, this particular form being square and having a seam along the middle line of its two opposite sides.

The invention may be embodied in yet other forms of pipe; but it is believed those shown serve to illustrate the principle of the invention and its application.

Although I have described this pipe as applied to the drainage of mines and similar works, it will be obvious that its utility is not limited thereto, and that it is applicable to the conduction of any kind of liquids and under any circumstances where such pipe would be effective.

What I claim as new is—

1. A pipe composed of a sheet-iron section shaped into cylindrical form with outwardly-projecting flanges along its opposite longitudinal edges, and a sheet-lead section similarly shaped and arranged within the sheet-iron section, with its flanges brought together face to face and secured to and between the flanges of the iron section.

2. A pipe composed of two or more sheet-iron sections, each shaped into the partial form of the pipe, with outwardly-projecting flanges at their longitudinal edges and provided with a sheet-lead lining, the sections being arranged in pipe form and their flanges secured together.

3. A pipe composed of sections of sheet-iron shaped longitudinally into pipe form and secured together along their longitudinal edges, and having a sheet-lead lining which is secured to the iron sections at their seams.

JAMES C. BAYLES.

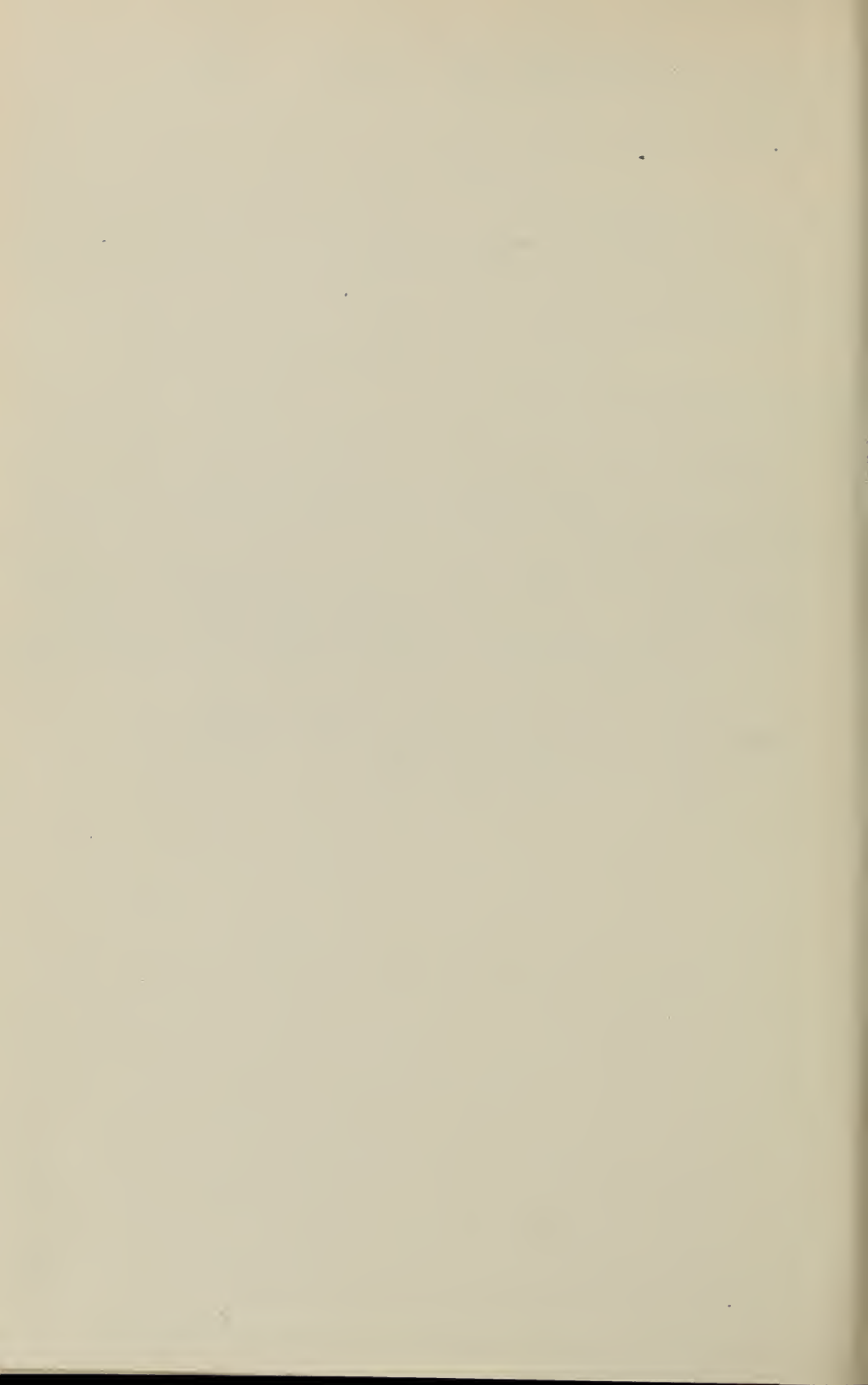
Witnesses:

FRANK E. HARTLEY,  
ERNEST HOPKINSON.

[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cal. Dfts. Exhibit "H." Oct. 2, '12. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "H." Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "H." Filed Apr. 8, 1916. F. D. Monckton, Clerk.



No. 612,639.

Patented Oct. 18, 1898.

J. CLAYTON.

AUDIPHONE.

(Application filed Dec. 8, 1896.)

(No Model.)

Fig. 1.

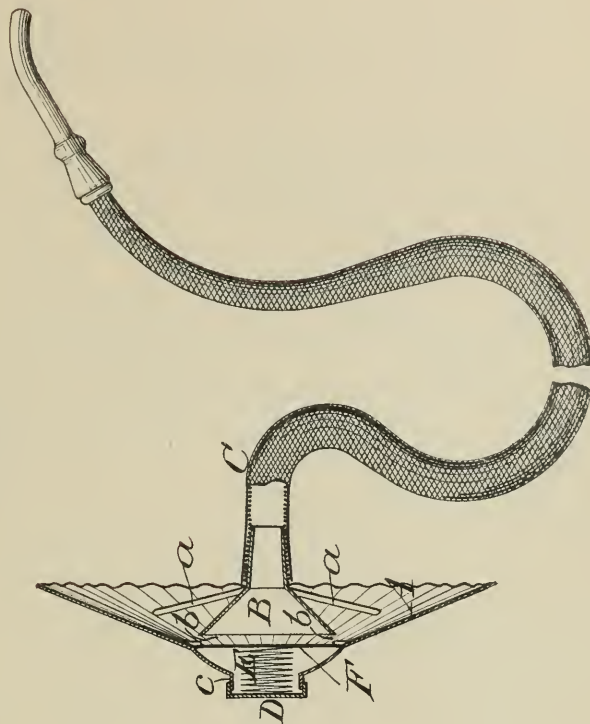
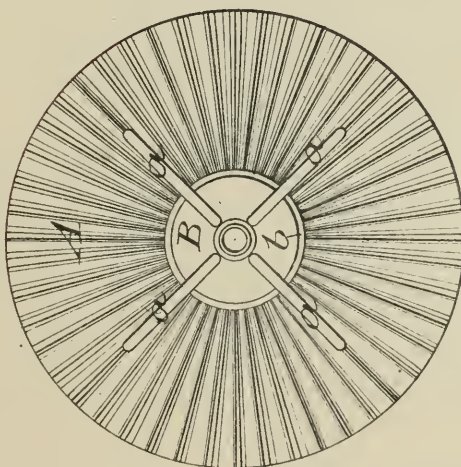


Fig. 2.



Witnesses:-

George Barry Jr.  
Edward (Sic.)

Inventor:

James Clayton  
by attorneys  
Brown & Howard







JAMES CLAYTON, OF NEW YORK, N. Y.

## AUDIPHONE.

SPECIFICATION forming part of Letters Patent No. 612,639, dated October 18, 1898.

Application filed December 8, 1896. Serial No. 614,868. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES CLAYTON, of the city of New York, (Brooklyn,) in the county of Kings and State of New York, have invented a new and useful Improvement in Audiphones, of which the following is a specification.

I will first describe my invention with reference to the accompanying drawings and afterward point out its novelty in the claims.

Figure 1 in the accompanying drawings represents a central sectional view of one example of an audiphone embodying my invention and provided with a flexible ear-tube. Fig. 2 is a face view of the same with the flexible ear-tube omitted.

A is a conical disk, opposite to the concave face of which is concentrically arranged the trumpet-mouth B of a sound-conducting tube C, represented as a flexible ear-tube, the said trumpet-mouth having its concavity in the opposite direction to that of the disk and being so affixed to the disk, as by radial arms *a a*, that an annular opening *b* is left between the edges of said mouth and the face of the disk. In front of the central portion of the disk opposite the trumpet-mouth there is distended a diaphragm F of suitable material, as very thin steel, the edges of the said diaphragm being united with the disk A, so that the annular opening *b*, before mentioned, is also between the diaphragm and the trumpet-mouth.

The portion of the disk A which surrounds the trumpet-mouth B is, in the example of the invention represented by the drawings, corrugated in radial lines from the diaphragm to its own circumference. The said disk has a central opening, around which is a socket *c*, and to this socket is fitted a cap D. Between this cap and the back of the diaphragm is placed a light coil-spring E, which is made to press with more or less force on the diaphragm, according as the cap is adjusted on the socket toward or from the diaphragm.

The operation is as follows: The instrument is held by the listener with the concave face of the disk A toward the speaker or

source of sound, and the end of the ear-tube is placed in his ear. The sound-waves striking the disk are gathered therein toward the center thereof and are thereby directed over the diaphragm and into the trumpet-mouth of the conducting or ear tube, the vibrations of the diaphragm greatly assisting in the sound transmission. The adjustment of the cap D and the adjustment of the pressure of the spring upon the diaphragm thereby produced give the diaphragm greater or less tension and a more or less active vibration, which can be regulated as may be found desirable by the person using the instrument.

It has been found by careful and repeated experiments in the use of an instrument of this kind that as compared with a smooth conical disk the radially-corrugated disk is very much more effective.

What I claim as my invention is—

1. In an audiphone, the combination of a conical disk, a flexible diaphragm distended in front of the central portion of the concave face of and having its edges attached to said disk, and an ear-tube having a trumpet-mouth which is attached concentrically to said disk with its concavity in the opposite direction to the concavity of the disk and with an annular opening between its edges and the disk and diaphragm, substantially as herein described.

2. In an audiphone, the combination of a conical disk having a central opening, a flexible diaphragm distended in front of the concave face of and having its edges attached to said disk, an adjustable cap fitted to the central opening of the said disk behind the diaphragm, a spring located between the said cap and diaphragm for varying the tension of the diaphragm as the cap is adjusted, and an ear-tube having a trumpet-mouth attached to the said disk at the concave face thereof opposite to and spaced from the diaphragm, substantially as herein described.

JAMES CLAYTON.

Witnesses:

FREDK. HAYNES,  
LIDA M. EGBERT.



[Endorsed]: District Court of the United States, in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co. vs. Sherman, Clay & Co. Defendant's Exhibit Clayton Patent. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit Clayton Patent. Filed Apr. 8, 1916. F. D. Monckton, Clerk.



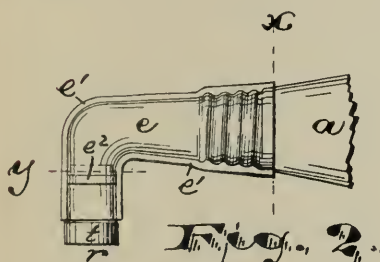
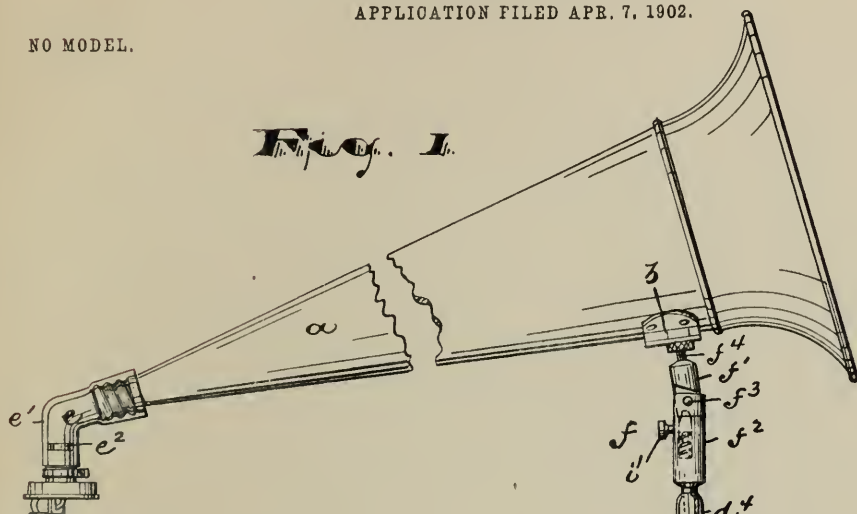
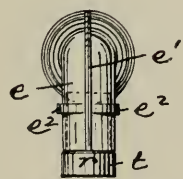
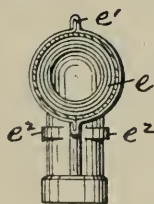
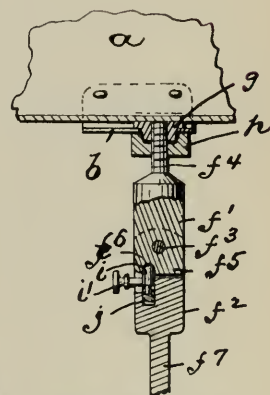
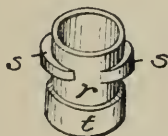
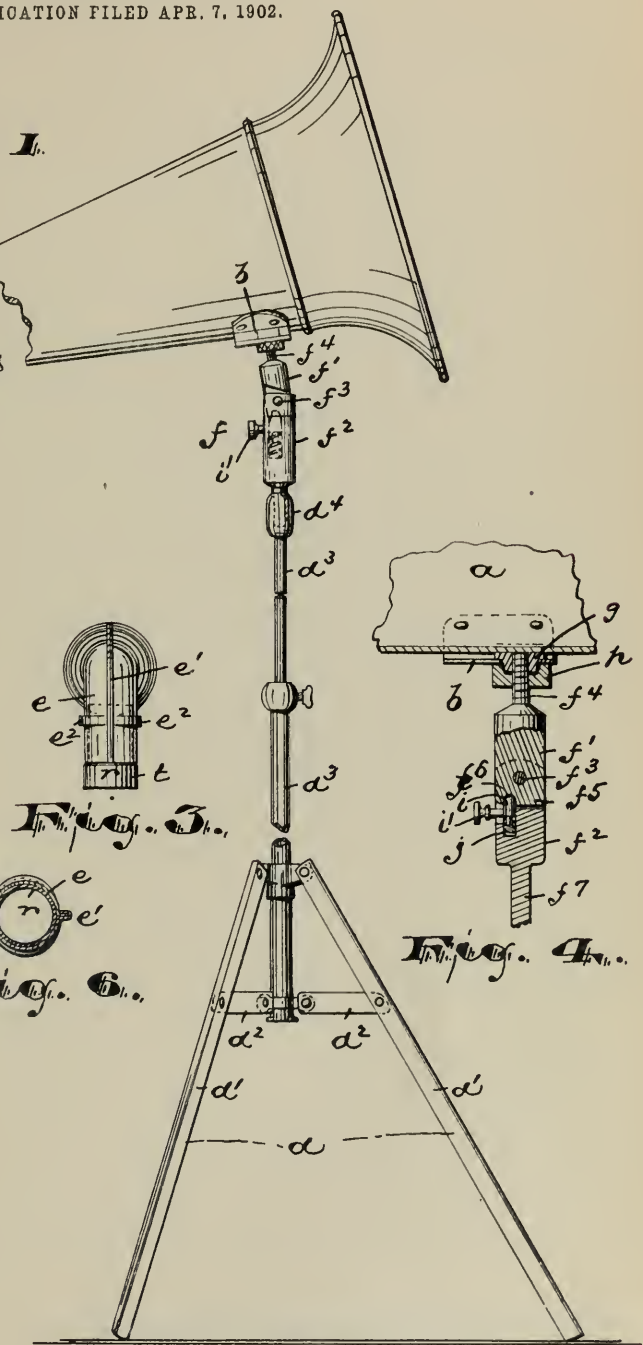
No. 738,342.

PATENTED SEPT. 8, 1903.

A. S. MARTEN:  
INTERCHANGEABLE SOUND AMPLIFYING MEANS FOR TALKING  
OR SOUND REPRODUCING MACHINES.

APPLICATION FILED APR. 7, 1902.

NO MODEL.

**Fig. 1.****Fig. 2.****Fig. 3.****Fig. 4.****Fig. 5.****Fig. 6.****Fig. 7.**

WITNESSES:

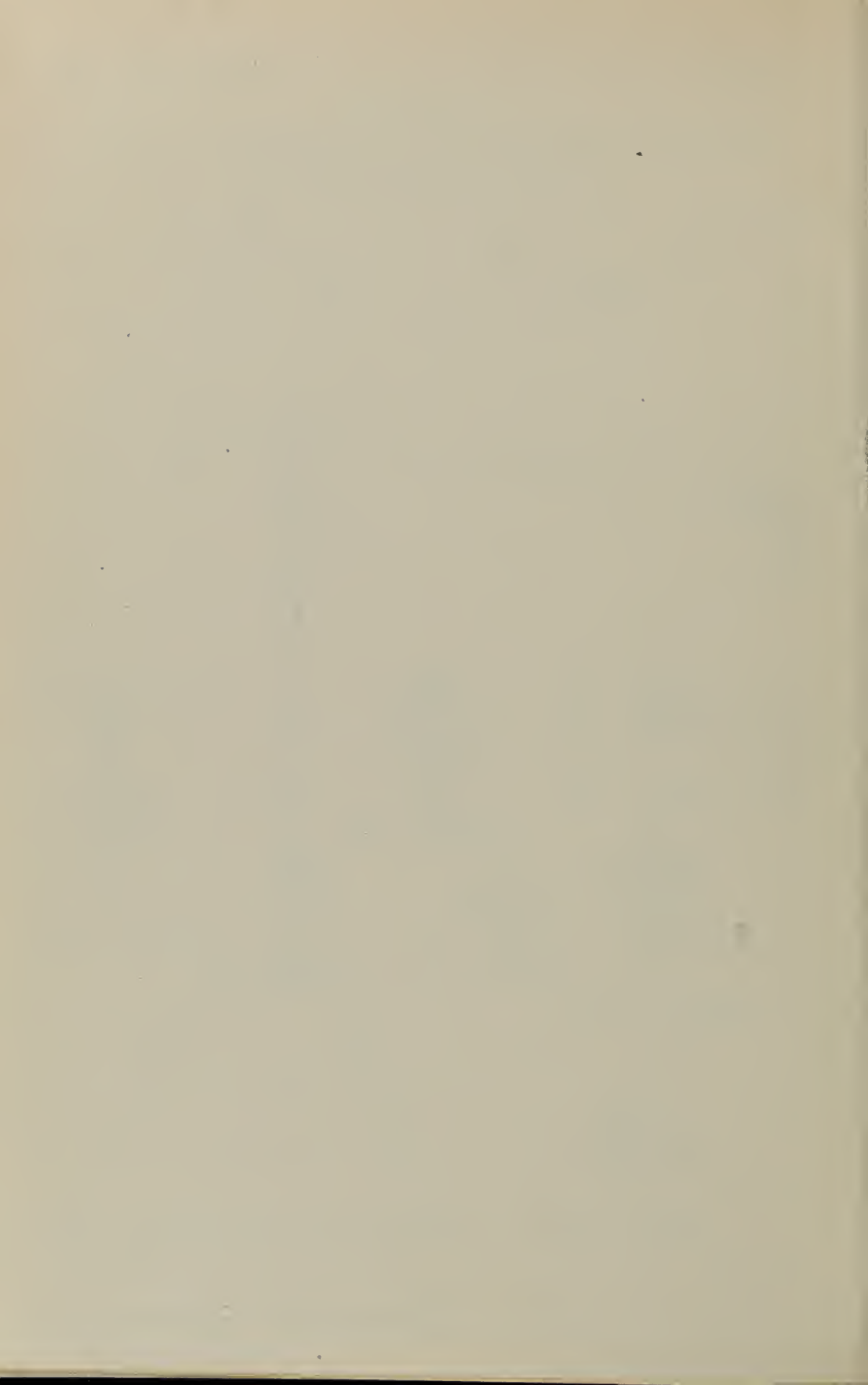
INVENTOR

Harry Krug

Russell M. Everett

Albert S. Marten,

BY





## UNITED STATES PATENT OFFICE.

ALBERT S. MARTEN, OF EAST ORANGE, NEW JERSEY.

INTERCHANGEABLE SOUND-AMPLIFYING MEANS FOR TALKING OR SOUND-REPRODUCING MACHINES.

SPECIFICATION forming part of Letters Patent No. 738,342, dated September 8, 1903.

Application filed April 7, 1902. Serial No. 101,648. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT S. MARTEN, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Interchangeable Sound-Amplifying Means for Talking or Sound-Reproducing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in that class of sound-amplifying connections for phonospheres, phonographs, graphophones, gramophones, and similar sound recording and reproducing machines illustrated in the application filed in the United States Patent Office January 24, 1902, Serial No. 91,032, the objects of the present improvements being to increase the convenience with which interchanges of the horn and talking-machines can be effected to facilitate construction and secure a more efficient operation of the parts and to obtain other advantages and results, some of which may be more fully and specifically referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved interchangeable sound-amplifying means for talking or sound-reproducing machines and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1 is an elevation showing a horn supported upon a stand, said horn being separably attached to the diaphragm-box or speaker of a sound-reproducing machine. Fig. 2 is a detail showing the small end of the horn, on which is a tubular metallic connection having a rubber or other elastic connection inserted therein. Fig. 3 is an end view of the same. Fig. 4 shows in detail an upper extension of the stand; and Figs. 5

and 6 are sectional views taken at lines *x* and *y*, respectively. Fig. 7 is a detail view of a certain elastic washer.

In said drawings, *a* indicates the horn, which is of the construction described in my said prior application, being provided at its small end with a screw-thread and near its large end with a socket *b*, adapted to receive the vertical center post of the stand *d*. Separably attached to the said small end of the horn is a short rigid metallic tube *e*, threaded in correspondence with the threads on the horn, and thus adapted to be screwed firmly and tightly to the horn, so that there will be no looseness at the joint conducive to vibration and an interference with proper sound reproductions. Said metallic tube *e* is also separable and independent from the diaphragm-box or speaker.

The stand *d* is preferably of the folding type, having legs *d'*, braces *d''*, and the center-post *d'''*, the latter being in telescopic sections. The center-post is provided at the top with a socket *d'''* for a separable extension *f*, the latter comprising pieces *f'* *f''*, hinged together, the hinge-pin being shown at *f'''* in Figs. 1 and 4. At the top of the upper section *f'* the same is threaded, as at *f''*, and provided with clamp-plates *g* *h*, one to enter the socket and the other to clamp the parts in rigid immovable relation, the second being preferably a finger-nut, threaded to properly engage the threads *f''*. At the lower end of the extension section or part *f'* the same is provided with a stop bearing *f'''* to engage the lower section or part *f''* and limit the pivotal movement of the upper member *f'*, so that it will stop when it arrives at a position of vertical alinement with the lower section *f''* and the post *d'''*. The said lower end of the section or part *f'* is also provided at *f''''* with a socket to receive the projecting end of a latch-bolt *i*, arranged in a spring-chamber formed in the section or part *f''*. Below said latch-bolt a spring *j* is arranged in said chamber to throw the latch-bolt into its locked position. The latch-bolt has a lateral finger-piece *i''*, by which it can be pressed down against the spring *j* to release the section or part *f'* to permit the turning of the member or part *f'* to a horizontal position and the horn to a vertical position, as hereinafter described. At the lower end of the part *c*

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section  $f^2$  the same is reduced in diameter to form a leg  $f^7$  to enter the socket  $d^4$ , where it may be removably secured or allowed to rest free to be withdrawn at will.

By uncoupling the small end of the horn and pressing down upon the finger-piece  $i$  the horn will assume a vertical position because of the arrangement of the socket described, the small end of the horn overbalancing the large end and the latter lying uppermost. The vertical arrangement of the horn on the stand permits the horn to be set aside in a corner, where it will not occupy much floor-space and without detaching said horn from its stand, the bell thus lying free from the floor away from danger of injury.

The construction described, taken in connection with separable coupling-tubes suited to the machine with which the horn is to be used, enables a rigid connection to be made with the machine and yet permits of a quick detachment without removing the horn from the stand. The tubular connection preferred for the disk-machines and the phonosphere is angularly formed and pressed in half-sections from sheet metal, each section having a flange  $e'$  extending around the angle from one end of the tube to the other, one of the flanges being wider than the other, and thus adapted to be doubled over the other to hold the sections together, as shown in Fig. 5. At one end of each section of the tube  $e$  the metal is impressed with screw-threads which correspond, so that when the sections are joined the threads will be continuous spirals suited to receive the threads of the horn. At the opposite end of the tube the sections are indented or impressed to form hollow outwardly-projecting bosses  $e^2$ . The cavities formed on the inside of the bent tube are adapted to receive stay ribs or lugs  $s$ , cast or formed on the periphery of an elastic washer  $r$ . Said washer fits closely within the end of the tube  $e$  and is held therein by the ribs or lugs  $s$ , which are adapted to spring into place in the cavities when the washer is forced into the tube. The elastic washer at one end is formed with an outward annular rib  $t$  on its periphery, which forms a shoulder against which the end of the metallic tube abuts. By this construction the tube  $e$  can be fitted closely upon the tubular extension of the speaker or diaphragm-box without danger of looseness due to variations in diameter of said tubular extensions or the interference with proper sound reproductions because of such looseness.

To change the horn from a phonograph to a phonosphere, for example, it becomes only necessary to withdraw the tubular extension 60 suited to the phonograph from the speaker or diaphragm-box of said phonograph, unscrew the said tubular connection, the horn being

held at the desired horizontal position to facilitate the work, then apply the angular and threaded connection  $e$  by screwing it upon the horn, and finally pushing the cushion-like or elastic washer thereof upon the speaker of the phonosphere, thus enabling the one horn to serve with either of the various talking machines.

Having thus described the invention, what I claim as new is—

1. The combination with the horn and speaker or diaphragm-box, of a tubular metallic connection separable from the horn and having at its end distant from the horn an elastic washer having a detent holding said washer within said connection when withdrawing the same from the diaphragm-box and adapted to engage the said diaphragm box, substantially as set forth.

2. The combination with the horn having threaded small end, of a tubular connection screwed at one end on said horn and thereby removably fixed against movement in the direction of the longitudinal axis of the said horn and at the opposite end having an elastic rubber washer fitted therein and adapted to receive the speaker or diaphragm-box, substantially as set forth.

3. The combination with the horn having a threaded small end, of a tubular connection screwed on said small end, and having at its end opposite that receiving the horn, an elastic washer, the connection being interiorly indented to form a hollow recess and the washer being provided with lugs to enter said hollow recess, substantially as set forth.

4. The combination with the horn, speaker, diaphragm-box and stand, of a rigid, angular metallic tube, interposed between said horn and box and separable from both said horn and said box, said tube being in section flanged and joined together at their edges substantially as set forth.

5. The combination with the horn, diaphragm-box and stand, of a coupling-tube adapted to be secured to the horn and provided with means to resist longitudinal movement, or movement both inward and outward in the direction of the longitudinal axis of the horn from the said horn, and having an india-rubber washer secured in the end thereof opposite that having said means for resisting said longitudinal movement and adapted to closely fit speakers or diaphragm-boxes of varying diameters, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of March, 1902.

ALBERT S. MARTEN

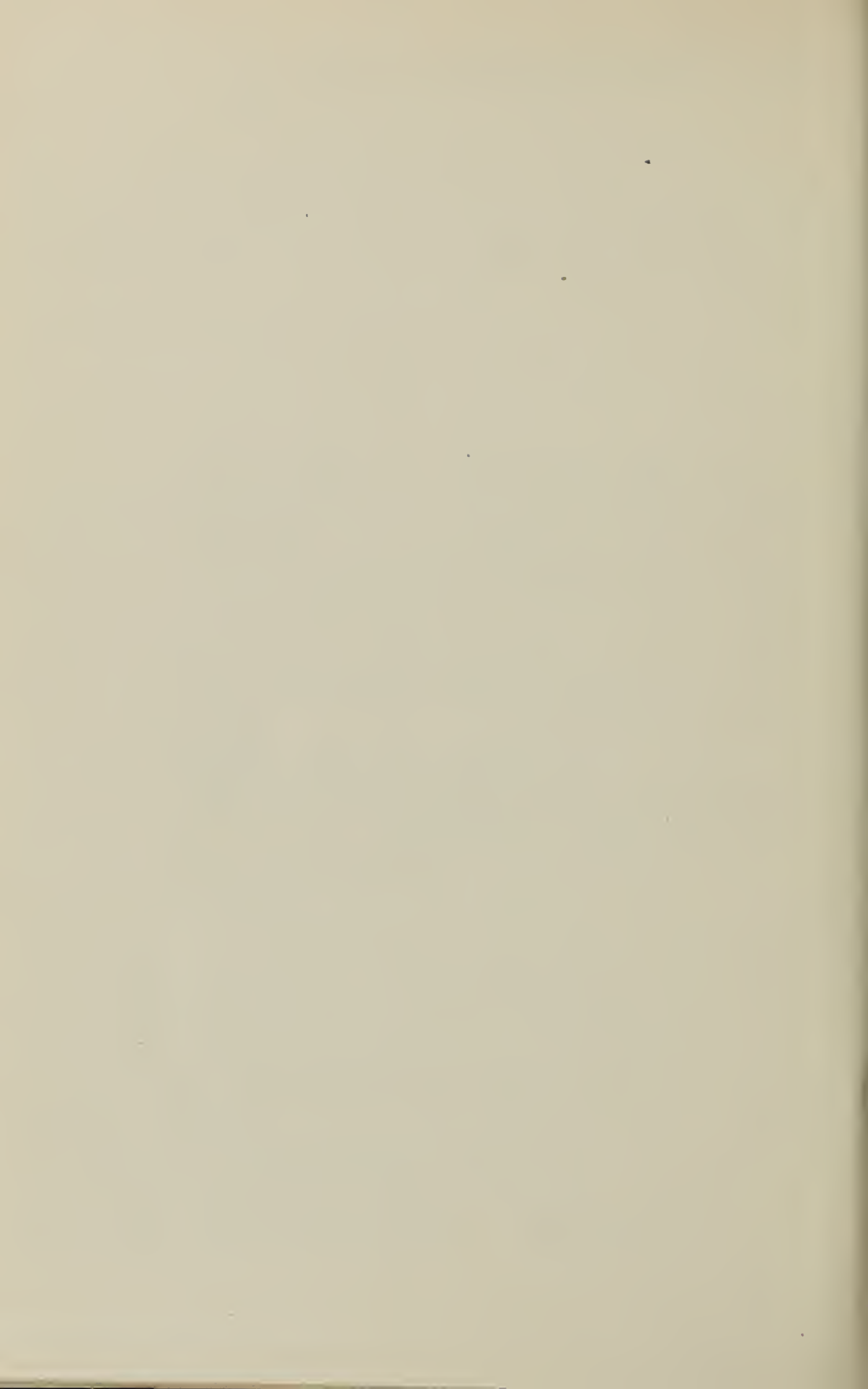
Witnesses:

CHARLES H. PELL,  
C. B. PITNEY.

[Endorsed]: District Court of the United States, in and for the Northern District of California, Second Division. In Equity—No. 15,623. Searchlight Horn Co. vs. Sherman, Clay & Co. Defendant's Exhibit Marten Patent. Alexander Park, Notary Public.

Filed Jul. 27, 1914. W. B. Maling, Clerk. By J. A. Schaertzer, Deputy Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit Marten Patent. Filed Apr. 8, 1916. F. D. Monckton, Clerk.





S. TAKABA.  
LAMP SHADE.

(Application filed June 24, 1901.)

(No Model.)

Fig. 1.

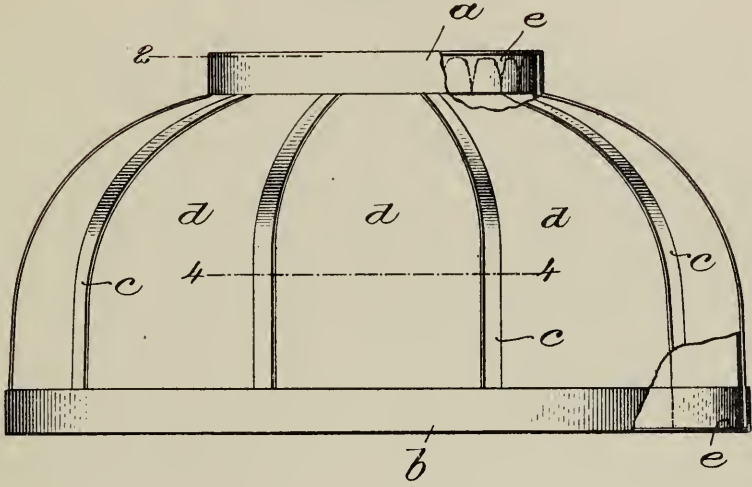


Fig. 3.

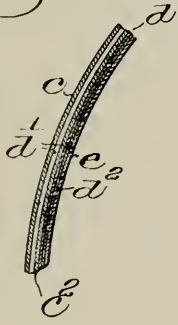


Fig. 4.

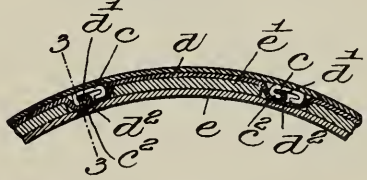
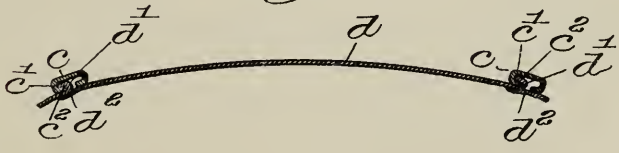
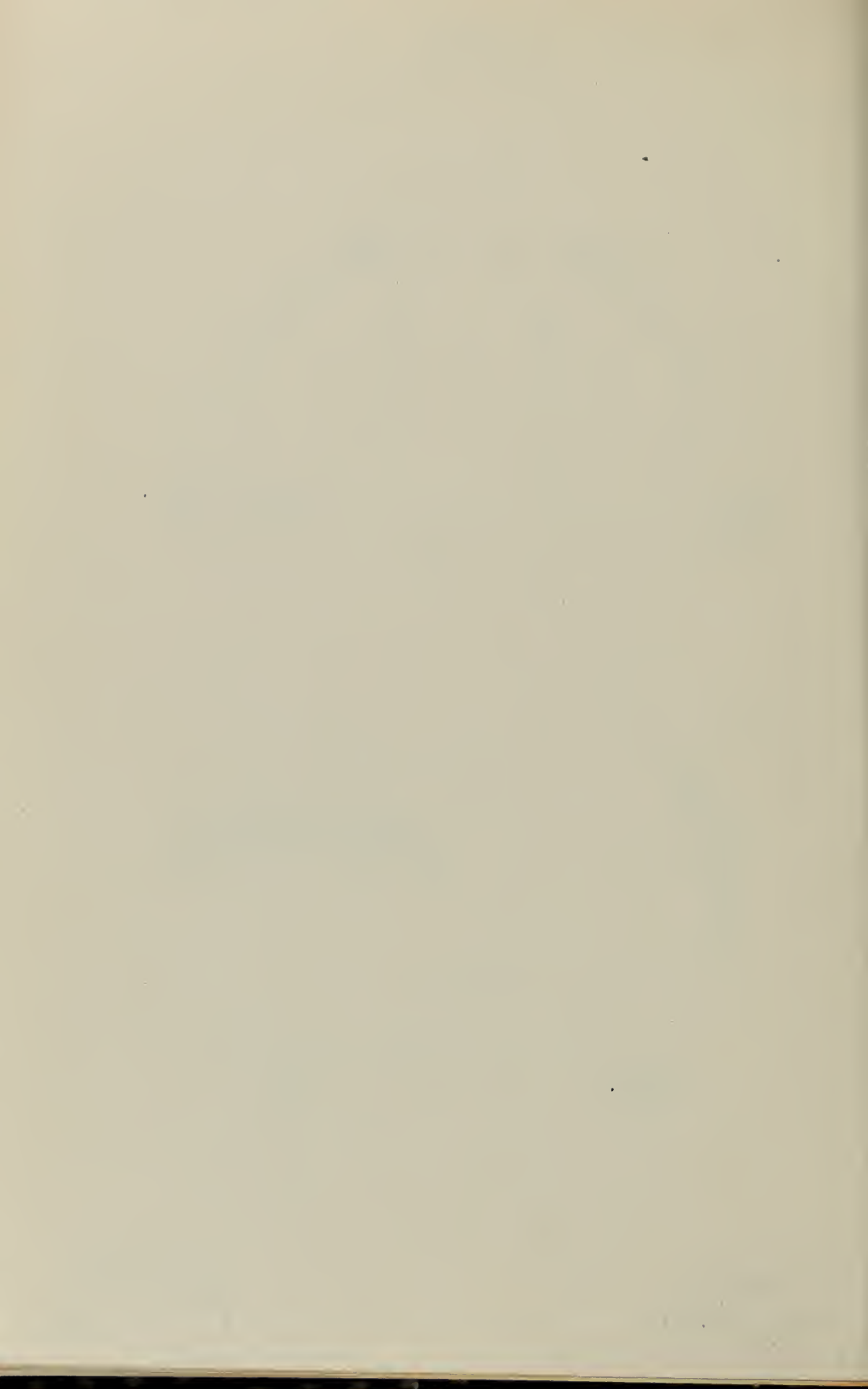


Fig. 5.



Witnesses:  
Fred S. Grunkap  
Adolph Trauer.

Inventor,  
Shiro Takaba,  
by Henry Gregory  
attys.





# UNITED STATES PATENT OFFICE.

SHIRO TAKABA, OF BOSTON, MASSACHUSETTS.

## LAMP-SHADE.

SPECIFICATION forming part of Letters Patent No. 693,460, dated February 18, 1902.

Application filed June 24, 1901. Serial No. 65,785. (No model.)

*To all whom it may concern:*

Be it known that I, SHIRO TAKABA, a subject of the Emperor of Japan, residing at Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Lamp-Shades, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is an improvement in lamp-shades of the kind called "Japanese" lamp-shades, in which a light frame is provided with panels or sections of ornamental material, usually of a translucent nature, commonly paper, which is hand-painted or otherwise decorated. Shades of this character have commonly been composed heretofore of a light wooden frame, to which the paper panels have been pasted. Such frames, however, are easily injured and rapidly deteriorate under the influence of the extreme heat from the lamp, so that they become brittle and easily broken, and also it is difficult to paste the paper panels in place and retain them properly on account of the curvature and materials. Accordingly I have devised the hereinafter-described shade of an exceedingly light and durable character, consisting of a metal frame containing specially-formed ribs, which receive the vertical edges of the panel in interlocked relation in such a manner as to give the shade permanence and stability of shape, while at the same time facilitating its construction and producing a trim and neat appearance.

The constructional details of my invention will be pointed out more fully in the following description, reference being had to the accompanying drawings, in which I have shown a preferred embodiment of the invention, and the latter will be further defined in the appended claims.

In the drawings, Figure 1 represents in side elevation a shade containing my invention, parts thereof being broken out for clearness of illustration. Fig. 2 is an enlarged horizontal sectional view taken on the line 2, Fig. 1. Fig. 3 is a transverse vertical section taken on the line 3 3, Fig. 2. Fig. 4 is an enlarged horizontal section taken on the line 4 4, Fig. 1.

As herein shown, the frame consists of upper and lower rings *a b* and vertical ribs *c*,

properly bent or arched, the whole, when of metal, being soldered or otherwise secured together. These inclose a plurality of panels *d*, although it will be understood that I do not restrict myself in all respects to the details of shape and arrangement shown. The ribs *c* are preferably of metal capable of being rolled inwardly to provide a longitudinal pocket *c'* or overhanging retaining-flange *c''* for receiving and holding the inturned edge *d'* of the adjacent panel.

It is difficult to paste a paper panel to a metal rib, and, as already stated, it is difficult to retain the panel in proper shape and position simply by pasting it or laying it flat against a rib; but by tucking in the edge *d'* of the panel and preferably cementing it in place behind the retaining rib or flange *c''* of the rib, as shown, the panel is secured properly in place and the operation is performed with a despatch and neatness not practicable in the old construction referred to.

Having secured one edge of the panel, as shown in Fig. 4, the adjacent longitudinal edge *d''* of the next panel is preferably lapped over and cemented or otherwise secured to the edge *d'*, which has thus been inserted and cemented in place, as shown clearly in Figs. 2 and 4, paper supporting paper readily. In this manner the succeeding joints between the edges of the panels are made until the whole shade is completed, the resulting construction being exceedingly strong, neat in appearance, definite and certain in shape and position, and with no possibility of separation of the panels from the ribs or frame. At their ends the panels and ribs are clamped between bands *e* and the rings, said bands being preferably of some suitable pliable material, pasteboard answering for this purpose in some instances, retaining-pieces *e'* being preferably interposed, and the whole held in place by any suitable means, some kind of cement being usually sufficient.

The frame being of metal is exceedingly durable, maintaining its vigor and strength notwithstanding the heat to which it is subjected by the lamp, whereas the kind having wooden frames gradually became brittle.

The shade is not only strong, but rigid and very light.

It will be understood that while I prefer to

construct the shade precisely as shown, yet I do not limit myself thereto, as many changes may be resorted to within the spirit and scope of my invention, as will be more evident upon  
5 reference to the claims.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A lamp-shade, having its shade-surface  
10 composed of ribs and panels, a longitudinal pocket being provided in each rib, a longitudinal edge of an adjacent panel being bent into interlocked engagement with the pocket of the adjacent rib, and means applied to said  
15 longitudinal edge and distinct from said rib for maintaining said panel and rib permanently in their interlocked relation.

2. A lamp-shade, having its shade-surface composed of ribs and panels, said ribs having  
20 longitudinal pockets in their under sides, one longitudinal edge of a panel being bent back

on itself and interlocked with the adjacent rib, and a longitudinal edge of the contiguous panel being secured to the back of the panel thus interlocked.

3. A lamp-shade, having its shade-surface composed of ribs and panels, said ribs having longitudinal pockets in their under sides, one longitudinal edge of a panel being bent back on itself and interlocked with the adjacent rib, a longitudinal edge of the contiguous panel being secured to the back of the panel thus interlocked, and a ring and band, the upper ends of said panels and ribs being clamped between said ring and band.

In testimony whereof have signed my name to this specification in the presence of two subscribing witnesses.

SHIRO TAKABA.

Witnesses:

GEO. H. MAXWELL,  
WILHELMINA C. HEUSER.

[Endorsed]: No. 15,326. U. S. Dist. Court, Nor. Dist. of Cal. Dfts. Exhibit "C." Oct. 2, '12. M., Deputy Clerk.

No. 2306. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "C." Received Aug. 19, 1913. F. D. Monckton, Clerk.

No. 2759. U. S. Circuit Court of Appeals for the Ninth Circuit. Defendant's Exhibit "C." Filed Apr. 8, 1916. F. D. Monckton, Clerk.



[Second Edition.]

N<sup>o</sup> 17,786

A.D. 1902

Date of Application, 13th Aug., 1902—Accepted, 25th Sept., 1902

## COMPLETE SPECIFICATION.

## Improvements in Phonographs and other Talking Machines.

I, HENRY FAIRBROTHER of 49 Kestrel Avenue, Herne Hill London S.E. Metal Trades' Valuer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- 5 My invention relates to that class of talking machine in which the reproduction of sound is produced by attaching a stylus to a trumpet, said trumpet being vibrated direct by the stylus from the record which carries the sound writing. The principal features of the invention are the method of attaching the said stylus to the trumpet, the material of which the trumpet is formed the formation of a longitudinal rib on the trumpet practically normal to the side thereof, the method of supporting the trumpet and of forming the joints therein and also the addition to the said trumpet of an internal tongue to increase the vibration.

- 10 My trumpet may be of any suitable form but is preferably cone or funnel shaped and is provided with a flanged or bell shaped mouth. I form the trumpet chiefly or entirely of sonorous material such as gelatine, indurated fibre, celluloid, paper or the like and compose it of one or more sheets of the same. By preference I make it of two or three sheets and of different materials, said sheets being in the form of layers or folds which are stuck together by any suitable adhesive substance. For instance, I may use a sheet of gelatine or cellulose material, backed up with a sheet of fibrous material such as paper, or of a sheet of cellulose material and a sheet of gelatine material stuck together. The object in using more than one sheet is for cheapness of manufacture as well as to improve the tone, as a certain thickness is required to obtain good results. I therefore use a thin sheet of the more expensive material and get the required thickness of the trumpet by
- 25 backing it up with cheaper material.

I employ several methods of forming the rib on the trumpet as well as several methods of attaching the stylus to the trumpet and also several methods of forming the trumpet from the sheet or sheets of material.

- I will now describe my invention with reference to the accompanying drawings in which:—

- Fig. 1 shows an elevation of a cone-shaped trumpet partly in section, provided with a bell mouth which trumpet is constructed mainly of gelatine, indurated fibre, celluloid, paper or any other suitable sonorous material. By preference I form it from one sheet of material with a lap joint or turnover seam, longitudinally and glued or cemented together

- This trumpet is fitted at its smaller end with a plug of suitable material such as wood, the end of which, projects outside and in which a hole is cut to receive a stylus which is preferably made of glass. The wood plug is preferably formed with a saw cut or split in order to give it a springy grip of the stylus. The wood plug is extended inside the trumpet in the shape of a thin flat tongue wider at its outer end to conform to the shape of the trumpet, to the walls of which it may be fastened if desired. This tongue greatly improves the reproductions but is not essential. If desired a small piece of cloth, leather or rubber may be held between the tongue and the wall of the trumpet where it is fastened or in contact
- 45 to still further improve the reproduction. The tongue is shown split as this further increases its usefulness and allows it to vibrate more freely with the walls

[Type Set]



*Fairbrother's Improvements in Phonographs and other Talking Machines.*

of the trumpet. Instead of having a hole for the stylus, the plug may be provided with a point or pin over which a hollow stylus is fitted.

This drawing also shows one method which I adopt for supporting the trumpet from close under the bell shaped mouth.

Fig. 2. is a plan view of Fig. 1, the bell mouth and wide end of the trumpet not being shown. 5

Fig. 3 is a side elevation of another form of trumpet and shows a different method of attaching the stylus to the same. In this case a block of suitable material, such as wood, is inserted in the end of the trumpet and is centrally bored to receive the stylus which may be permanently or removably fixed therein 10  
The drawing shows the stylus resting on a record of the usual cylindrical shape

Fig. 4 shows a side elevation of a trumpet provided with a rib on its under side to which is attached the support of the trumpet and also a clip to hold the stylus.

Fig. 5 is an enlarged sectional view on the line *x* of the end of the trumpet and of the clip and stylus shown in Fig. 4. 15

Fig. 6 is a sectional view on the line *y* of the trumpet shown in Fig. 4 and

Fig. 7 is a sectional view on the line *z* of the trumpet shown in Fig. 4.

Fig. 8 shows a perspective view of a grooved block which I use by preference for the formation of the folded or pressed rib such as that shown in Fig. 6

Fig. 9 is a sectional view of a part of the body of the trumpet and shows how I arrange the various sheets, in this case three in number, forming the same so that their joints overlap and do not come directly underneath or next to each other. 20

Fig. 10 is a view similar to Fig. 9 showing two sheets only.

Fig. 11 is a side elevation of a complete phonograph or talking machine showing the relative position of the parts, the means I adopt of supporting the trumpet from its smaller end and the method of attaching the stylus to the rib at about half way up the same. 25

Fig. 12 is a sectional view of the rib of a trumpet, such for instance as that shown in Fig. 11 and shows a U shaped cap which is clamped over the rib to strengthen it. 30

Fig. 13 is a plan view of the talking machine shown in Fig. 11.

Fig. 14 is a side elevation of a trumpet formed from one piece or strip of sonorous material which has been wound round a cone-shaped form to produce the desired shape, the edges of the said strip overlap each other so as to break joints. 35  
A double thimble or cap like clip is fitted to the end of the trumpet and also carries the stylus. The larger end of the trumpet rests on a double or universal joint to give free lateral and vertical movement and is supported by a swing rod.

Fig. 15 is a front view of the larger end of the trumpet shown in Fig. 14 and more clearly shows the joint by which the trumpet has free lateral or vertical movement. 40

Fig. 16 is a side elevation of a trumpet made from two strips of material which are wound round each other the joints overlapping so as to break the same. This trumpet is provided with a rib on its under side and is fitted with a cap at its smaller end to which the stylus is attached. 45

Fig. 17 is a section of the trumpet shown in Fig. 16 and shows a form of rib which is attached after the trumpet is made.

Fig. 18 represents a method of forming the trumpet with a rib which may be rivetted or cemented.

Fig. 19 is an end view of the same. 50

Referring to Figs. 1 and 2 *a* is the trumpet fitted with bell mouth *a'* and at its smaller end with plug *b*, to plug *b* is fitted or fixed the tongue *b'* which is split as shown and as rubber or other suitable material *c* at its ends. The other or outer end of the plug is formed in the shape of a ball and holds the stylus *s*, said ball being split or cut at *h* to improve the grip 55

To the wider end of the trumpet is fitted a band *d* provided with lugs carrying joint *e* to which is attached an inverted bearing *g* for the bracket or swing rod *f*



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*Fairbrother's Improvements in Phonographs and other Talking Machines.*

thus making a universal joint and giving free lateral and vertical movement to the trumpet

Referring to Fig. 3,  $\alpha$  is a trumpet of which the lower or narrower end only is shown, this end is fitted with plug  $b$  which is bored with a central hole  $\tau$  to which the stylus  $s$  is fitted. The stylus  $s$  is shown resting on the record  $rc$

5 Referring to Figs. 4, 5, 6, and 7  $a$  is the trumpet fitted with bell mouth  $a^1$  and rib  $k$  the upper part of which,  $k^1$  has been folded or turned back against the trumpet  $a$  to allow the bell shaped mouth  $a^1$  to pass over it. To the lower end of rib  $k$  is fitted clip  $l$  made of any suitable material which carries the stylus  $s$ . The stylus is preferably removable being pushed into a slot  $l^1$  in the clip  $l$ . The stylus rests on the record or sound writing by gravity or spring tension.

Referring to Fig. 8, The block  $p$  is grooved as shown at  $p^1$ , this is used to hold the folded or turned edges forming the rib  $k$  when made until the adhesive substance used in them has become hard or set.

15 In Figs. 9 and 10, the separate layers of material  $a$ ,  $a^1$ , and  $a^2$  may be formed of different material, for instance  $a$  may be gelatine  $a^1$  may be paper and  $a^2$  may be of gelatine or any other suitable material. The ends or edges  $j$  of these separate materials do not lie directly over one another or in the same line.

Referring to Figs. 11 and 13, the trumpet  $a$  is formed with a joint or rib  $k$  shown in cross-section in Fig. 12, which joint is covered with a U shaped cap  $q$  which fits closely over the rib and holds the joint securely. This trumpet is hung from the small end and the stylus  $s$  is attached to the rib at a point  $i$  some distance from the smaller end of the trumpet. The rod  $o$  is fastened to the trumpet at  $a^1$  which is hinged at  $a^2$  to allow a free vertical movement about  $a^2$  as a centre, the vertical rod  $o^1$  is also pivoted at  $a^2$  and rests loosely in the standard  $o^4$  so as to allow a free lateral movement about  $o^4$  as a centre. This standard is fixed to the base of the machine. The stylus  $s$  rests in the record by gravity and traverses the spiral sound writing of the record as it rotates. The record  $rc$  may be turned by a suitable handle such as  $rc^1$  or it may be turned by clockwork or other suitable means.

Referring to Figs. 14 and 15  $a$  is the trumpet formed spirally from a strip of material. At the lower end of the trumpet is fitted the double cap or thimble  $r$  one end of which embraces the trumpet and the other holds the stylus  $s$ .

To the wider end of the trumpet is attached a plate  $t$  formed with a lug  $m$  to which is jointed an inverted bearing  $g$  in which the spring rod  $o$  is free to work.

Referring to Fig. 16 the trumpet is formed from two strips  $a^1$  and  $a^2$  of material wound one over the other so as to break joints, the rib  $k$  may be attached afterwards as shown at  $k$  in Fig. 17.

40 Figs. 18 and 19 show another form in which I may make my trumpet, in this case the edges of the material are turned out and rivetted together as shown at  $r$  and a clip  $l$  is attached thereto to hold the stylus  $s$ .

I do not confine myself to any particular form or shape of the plug or of the tongue and the trumpet may be round, oval or any other suitable cross section.

In any of the above trumpets a single sheet or a sheet composed of more than one sheet of different materials stuck together may be used

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

1. A trumpet for phonographs or talking machines formed mainly of a sheet of sonorous material of a conical or pyramidal shape with a plug for attaching stylus fitted in its smaller end, said plug terminating in a vibratory tongue or plate, fitted to the inside of the trumpet, substantially as herein described and set forth

2. A trumpet for phonographs or talking machines formed mainly of a sheet of sonorous material of conical or pyramidal shape with a plug for attaching stylus fitted in its smaller end, said plug terminating in a vibratory tongue or plate

*Fairbrother's Improvements in Phonographs and other Talking Machines.*

fitted to the inside of the trumpet said tongue having a longitudinal slit to increase vibration, substantially as herein described and set forth.

3. A trumpet for phonographs or talking machines constructed mainly of a sheet of sonorous material and means for attaching the stylus by a plug in small end of trumpet with a hole in outer end of said plug for receiving the stylus, substantially as herein described and set forth. 5

4. A trumpet for phonographs or talking machines constructed mainly of a sheet of sonorous material and means for attaching the stylus by a plug in small end of trumpet with hole in outer end of said plug for receiving the said stylus, said plug being slitted or cut as shown at Fig. 2 for the purpose of gripping said stylus, substantially as herein described and set forth. 10

5. A trumpet for phonographs or talking machines constructed mainly of a sheet of sonorous material joined together by lap folded joints, cemented or glued and means for attaching stylus, thereto substantially as herein described and set forth. 15

6. A trumpet for phonographs or talking machines fitted with a stylus said trumpet being formed of layers or sheets of different sonorous material stuck together substantially as herein described and set forth.

7. A trumpet for phonographs or talking machines fitted with a stylus, said trumpet being formed of one or more sheets of sonorous or resonant material with a seam or longitudinal joint, such as described in various figures of drawings hereto annexed and substantially as herein of drawings hereto annexed and substantially as herein described and set forth. 20

8. A trumpet for phonographs or talking machines with a normal projecting rib and a stylus attached thereto, substantially as herein described and set forth. 25

9. The methods of attaching the stylus to the trumpet substantially as herein described.

10. A trumpet formed by winding two layers of strip material, as shown in Fig. 15 herein and a stylus attached thereto substantially as herein described

11. A trumpet formed by winding one strip of material with the edges overlapping into a cone or funnel shape substantially as herein described and as shown in Fig. 14 of the annexed drawings 30

Dated this 13th. day of August 1902.

HY. FAIRBROTHER,  
33 Cannon St London. E.C. 35

A.D. 1902. AUG. 13. N<sup>o</sup>. 17,786.  
FAIRBROTHER'S COMPLETE SPECIFICATION.

(2<sup>nd</sup> Edition)

SHEET 1

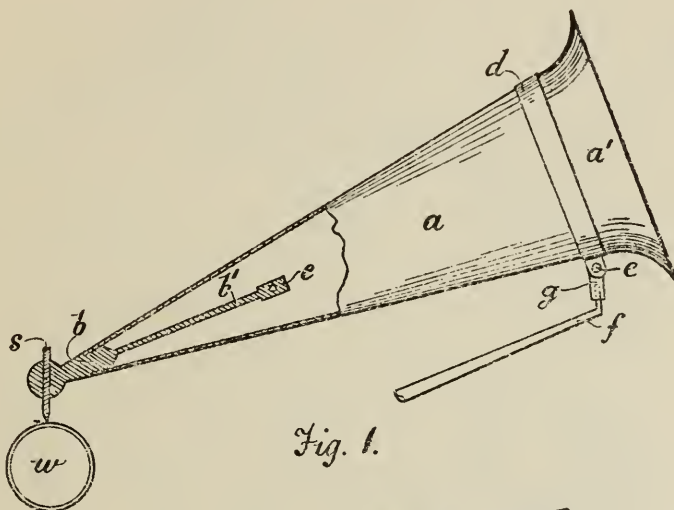


Fig. 1.

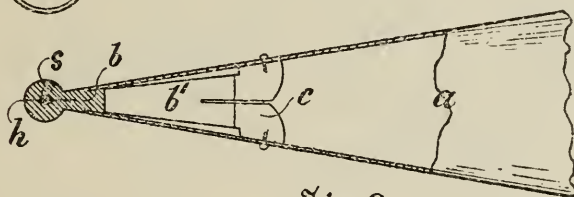


Fig. 2

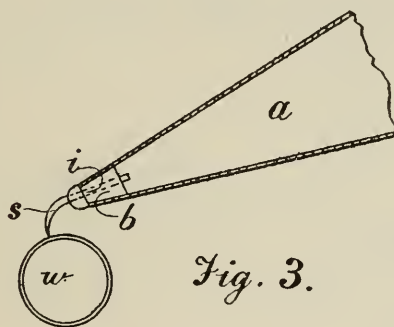
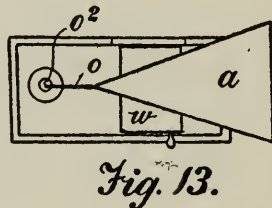
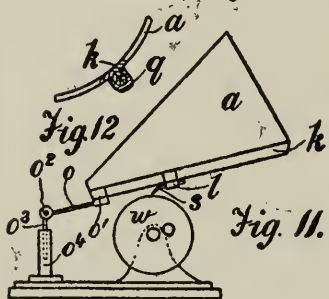
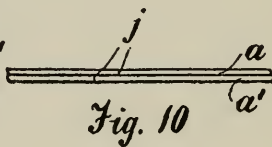
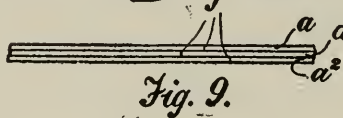
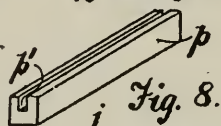
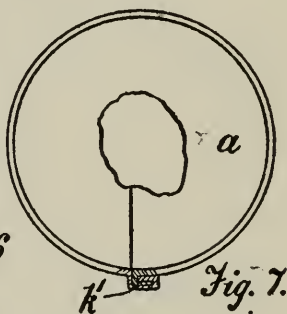
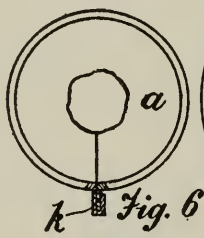
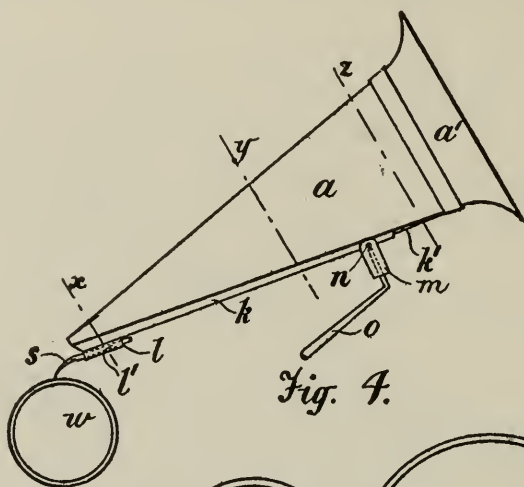


Fig. 3.

[This Drawing is a reproduction of the Original on a reduced scale.]

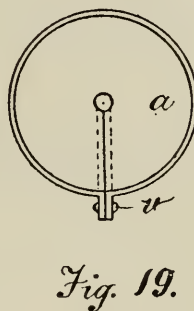
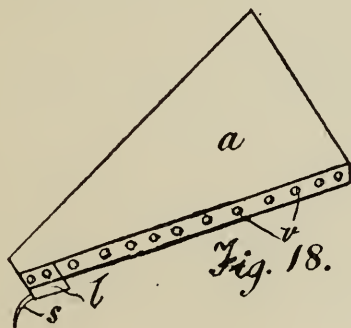
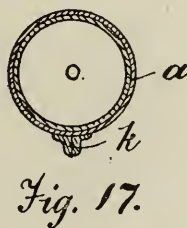
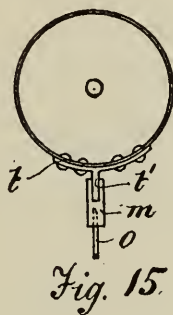
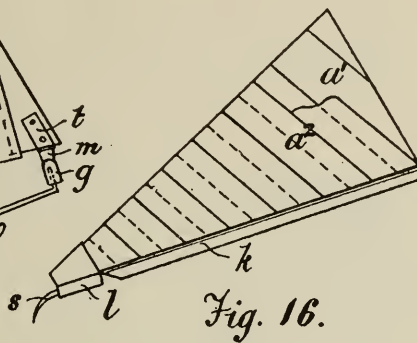
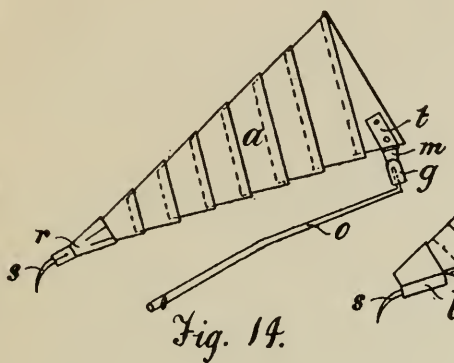


A.D. 1902. Aug. 13. N<sup>o</sup> 17,786.

FAIRBROTHER'S COMPLETE SPECIFICATION.

(3 SHEETS)  
SHEET 3.

(2<sup>nd</sup> Edition)



[This Drawing is a reproduction of the Original on a reduced scale.]



[Second Edition.]

N<sup>o</sup> 20,567

A.D. 1902

Date of Application, 20th Sept., 1902

Complete Specification Left, 18th June, 1903—Accepted, 20th Aug., 1903

## PROVISIONAL SPECIFICATION.

## "Improvements in Phonographs"

I, JOHN MESNY TOURTEL of 146A Queen Victoria Street, London E.C. Consulting Engineer, do hereby declare the nature of this invention to be as follows:—

My invention relates to improvements in or relating to phonographs. These improvements are primarily devised to render more efficient and satisfactory that type of apparatus in which a horizontal cylinder revolved by suitable apparatus, forms the support for the hollow cylindrical record, and the horn rests upon the surface of the said record by means of a stylus attached to its small end, which stylus follows the helical line traced by the recording point upon the surface of the record cylinder and thus reproduces the sounds inscribed thereon.

My improvements in this apparatus relate to the following points of the construction

## THE COVER.

In place of the exposed cylinder and partially exposed driving mechanism hitherto employed, I have devised a cover so arranged that all the working parts of the mechanism are enclosed without hindrance to their satisfactory operation. My cover which is of any convenient shape and preferably of sheet metal, is attached to the base plate of the mechanism by means of a long pin or bolt passing vertically upwards and provided with a milled nut, which nut is screwed upon the threaded end of the bolt which passes through the hole in the top of the casing. Similar apertures at the sides enable the insertion of the key and of the check screw, which prevents the revolution of the driving shaft. The end of the casing surrounding one end of the revolving cylinder is open and the record can be slipped into its place or removed therefrom without disturbing the cover. The cover is moreover slotted at the top, above the record, the said slot being of sufficient width to allow for the travel of the stylus from one end to the other of the record. By means of this cover, the working parts are efficiently enclosed, and the appearance of the apparatus is greatly improved.

## THE HORN.

The horn may be made of sonorous material in the well known manner. At the small end thereof, the stylus is cemented in or fastened to a plug fitted in the point of the said horn. I find that the preferable method of attachment is to cement the said stylus by means of a fabric and gelatine, or the like cement, to the material of which the horn is composed. But any other suitable cement may be employed whereby the stylus can be securely attached to the aforesaid plug, and this in turn intimately secured to the end of the horn. A further improvement relating to the horn consists in the means of supporting the same and imparting to it a sufficient pressure to cause the stylus to rest firmly upon the record. The horn itself being extremely light in proportion to its bulk, does not afford sufficient pressure by its weight alone. I therefore secure to the preferably metallic mouthpiece of the horn, a socket

[Price 8d.]



*Tourtel's Improvements in Phonographs.*

working in pivots and adapted to fit over a bent wire or the like support which is arranged to fit in a hollow socket formed by perforating one of the supporting feet of the base plate. The socket attached to the horn by its pivots is also attached to it by means of a spiral spring fixed in such a position that when the apparatus is in position with the socket upon the wire support and the stylus upon the record, the said spiral spring will be extended to the required degree to give the necessary downward pressure to the horn and thereby ensure the close contact of the stylus with the record. 5

## THE STYLUS.

This portion of the invention is improved as follows. I provide a long stylus of suitable material. This stylus may be a solid one or it may be more conical in shape than that hitherto in use, and hollow internally. In either case, the length of the stylus is considerably increased over the ordinary construction, and the top of it is formed in the shape of a disc or ring, intimately attached to the diaphragm of the horn. 15

## THE SUPPORTS.

In my improved construction, I provide firstly a support for the point of the stylus when the apparatus is out of operation. By this means, I can without dismounting the machine or leaving the stylus resting upon the record, or without providing another support for the horn, place the instrument instantaneously out of operation and return it to the working position again, equally quickly. The support for the stylus, consists of a little cup or box of any convenient shape, preferably secured to the top of the cover at one end of the slot for the stylus, already described. The bottom of this cup or receptacle is formed of some soft material, such as soft rubber, and upon this the point of the stylus can rest without injury. The supports of the base plate are formed in the shape of legs, preferably cast in one piece with the said plate, and three in number. On one of these legs is a hollow socket provided with a milled ridge on the outside, and internally threaded to fit the threaded foot cast in one piece with the plate. This socket serves to adjust the level of the apparatus. The front foot is formed hollow and serves as the socket for the end of the bar or wire supporting the horn. The upper edge of this socket is preferably notched to receive the cross pin in said support thereby holding the same rigidly in one position. The third leg may be adjustable or not, as desired. 20 25 30 35

Although in the foregoing, I have set forth the construction as found preferable at the present time, I do not limit myself to the details therein set forth: thus for instance, I may have more than three supporting legs, or I may attach my cover otherwise than by the long bolt described, and other alterations of design may be made, which are within the capacity of an experienced mechanic. But such alterations of the detail of the apparatus will remain within the scope of my invention herein set forth. 40

Dated the 20th day of September 1902

W. P. THOMPSON & Co.,  
322, High Holborn, London. W.C. 45  
Patent Agents.

## COMPLETE SPECIFICATION.

## "Improvements in Phonographs".

I, JOHN MESNY TOURTEL of 146A Queen Victoria Street, London E.C. Consulting Engineer, do hereby declare the nature of this invention and in what 50

*Tourtel's Improvements in Phonographs.*

manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

My invention relates to improvements in or relating to phonographs. These improvements are primarily devised to render more efficient and satisfactory that type of apparatus in which a horizontal cylinder revolved by suitable apparatus, forms the support for the hollow cylindrical record, and the trumpet rests upon the surface of the said record by means of a stylus attached to its small end, which stylus follows the helical line traced by the recording point upon the surface of the record cylinder and thus reproduces the sounds inscribed thereon.

In order to make my invention more clear, I have illustrated it in the accompanying drawings in which

Figure 1 shews a side elevation of the apparatus in the operative position.

Figure 2 shews a plan view of the same.

Figure 3 shews an isometric view on a reduced scale of the cover.

Figure 4 illustrates a section of the trumpet on the line X—Y of Figure 1.

Figure 5 shews the stylus on an enlarged scale in section.

Figure 6 shews another construction of stylus, in section through the stylus and the resonator drum to which it is attached.

In these drawings, A indicates the base plate, B the detachable cover, C the cylindrical record, D the trumpet, E the trumpet support. The base plate A may be of cast metal and supports a mechanism for giving rotary motion to the cylinder 1, on which the cylindrical record C can be slipped; the aforesaid mechanism forming in itself no part of my invention, is not specifically illustrated in the drawings, it may be of any suitable or known type. The base plate A has preferably two rear legs and one front leg arranged as shewn in dotted lines in Figure 2. One of the rear legs 2 is an ordinary cast iron leg. The other one is preferably a threaded bolt and somewhat shorter than its corresponding leg, but covered with a hollow socket 3 provided with a milled ridge or other convenient means for readily revolving it, and threaded internally to screw upon the threaded leg 2. By this means, an easy adjustment for levelling the apparatus is provided. The front leg 4 is hollow and forms a socket for the trumpet support E. This trumpet support is preferably constructed (as shewn in Figure 1 of the drawings) with a little cross pin 5 adapted to engage in a corresponding notch in the top of the hollow socket 4, thereby holding the rod or wire E firmly in place. Over the upper end of the rod E the socket 6 is arranged to fit. This socket is attached to a rim 7 of the trumpet D by means of the pivots 8. The socket 6 is attached to the trumpet D by means of the spiral spring 9 for the purpose hereinafter described.

The novelty of the construction of the trumpet resides in the arrangement for strengthening the same by the reinforcement of its lower part in the manner especially illustrated in Figure 4. The material of the trumpet which may be conveniently celluloid, or any other sufficiently light and resonant material, is curved to join at the edges into the form required, said join being in the shape of a V-shaped ridge running the entire length of the trumpet from the lower edge of the rim to the junction with the stylus. By this construction, the need of any special strengthening bars or reinforcement of other materials is obviated.

The stylus shewn in Figure 1 and sectionally in Figure 5 is formed of a curved tube terminating in a point and fitting in a wooden plug in the apex of the trumpet. Another form of stylus is shewn in section in Figure 6. It is preferably of a hard material such as glass or metal. It is formed of greater length than the stylus hitherto in use. To diminish its weight and render it more sensitive, it is formed hollow and is attached to the drum 12 by means of the annular or disc-shaped head 11. The junction of the drum or resonator 12 to the trumpet D is preferably by means of a fabric soaked in gelatine, cement or glue, but any other suitable cement may be employed.

*Towtel's Improvements in Phonographs.*

The cover B is so contrived that it can be removed from the apparatus or replaced without interfering with any of the working parts. Its general construction is illustrated in Figure 3.

The end of the cylinder I is arranged to project slightly through the circular aperture 13 leaving a convenient space for the manipulation of the cylindrical record which can then be inserted or exchanged without moving the cover. Above the record, there is provided the slot 14 which accords access to the surface of the record for the stylus. At one side of the cover is provided the receptacle 15 having a soft pad or plug of rubber or the like at the bottom thereof, and adapted to receive the point of the stylus when the instrument is out of operation. By means of this holder, the ordinary supporting fork and other more complicated devices are rendered unnecessary. The casing is formed preferably in one piece and is secured to the base plate A by means of a single bolt 16 having a threaded end and a milled nut 17 thereon. Other apertures are provided for the insertion of the winding key 18 on the one side, and of the check screw 20 on the other.

The general operation of the phonograph is well known and need not be here described.

The record having been placed in position upon the cylinder I, the cover B being in place and the driving mechanism started, the stylus 10 is lifted out of its receptacle 15 and put in place through the slot 14 of the cover. In addition to the weight of the trumpet D, the stylus is further impelled against the surface of the record by the action of the spiral spring 9, according to the strength of which the stylus will be more or less pressed upon the revolving record. The sounds caused by the inscriptions on the record are thus transmitted through the resonator to the trumpet and given forth. The apparatus can be easily taken to pieces for packing or removal and as easily reinstated, the cover which entirely protects the moving parts being attached to the base by only one screw.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a phonograph: a casing covering the mechanism and record having an aperture corresponding to the end of the record through which the said record can be removed or replaced without disturbing the casing, substantially as set forth.

2. In a phonograph: a casing adapted to cover the mechanism and the record whilst allowing the record to be interchanged without disturbing the casing, said casing secured to the base of the mechanism by a single long bolt and provided with a pad or support for the stylus of the trumpet when out of contact with the record, substantially as set forth.

3. In a phonograph: the adjustable support E for the trumpet socketted in the hollow front leg of the base, substantially as set forth.

4. The combination and arrangement of parts forming the improved phonograph constructed and operating substantially as described and illustrated in the accompanying drawings.

Dated the 18th day of June, 1903.

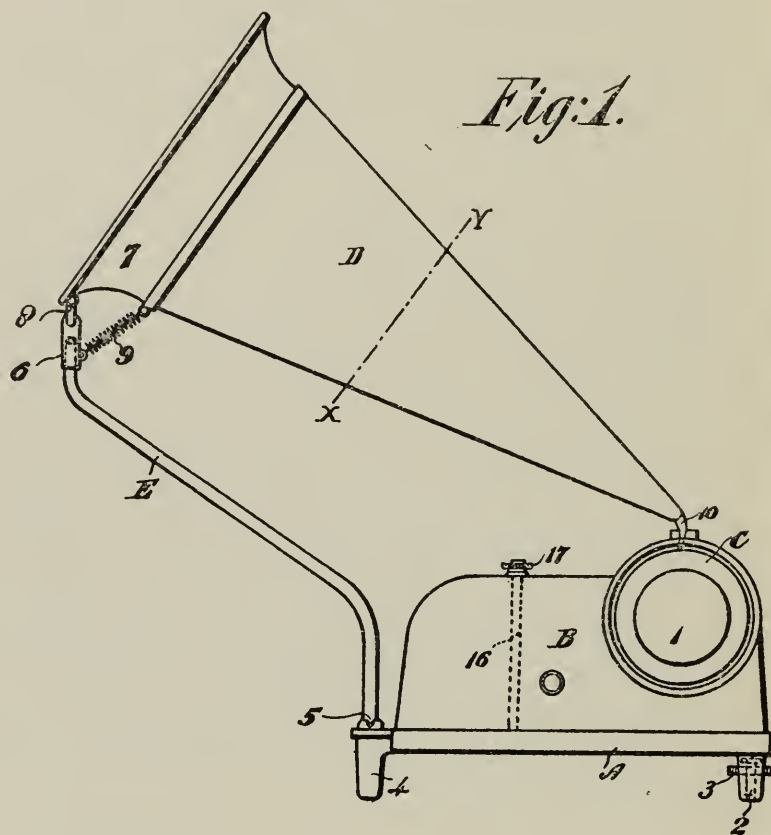
W. P. THOMPSON & Co.,  
322, High Holborn, London, W.C., and  
6 Lord Street, Liverpool  
Patent Agents for the Applicant.

A.D. 1902. SEP. 20. N.: 20,567.  
TOURTELS COMPLETE SPECIFICATION.

(2<sup>nd</sup> Edition)

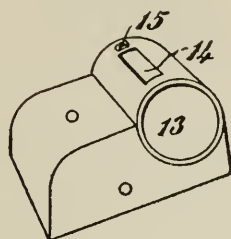
SHEET 1

[This Drawing is a reproduction of the Original on a reduced scale.]

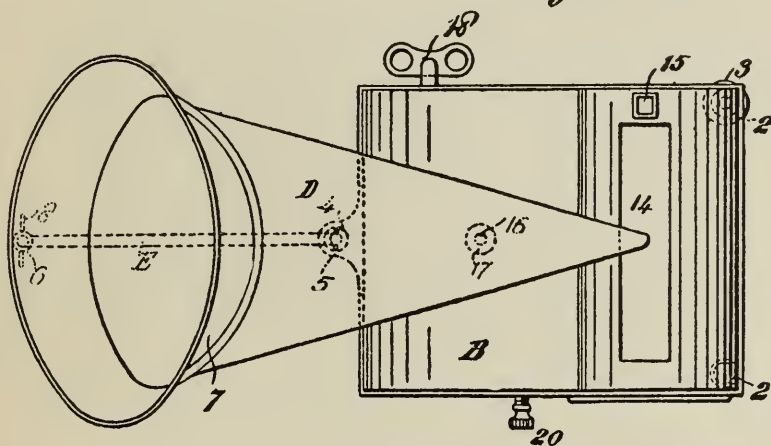




*Fig: 3.*



*Fig: 2.*



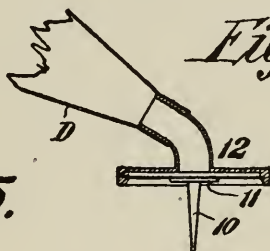
*Fig: 4*



*Fig. 5.*



*Fig: 6.*



[Second Edition.]

N<sup>o</sup> 5186

A.D. 1903

Date of Application, 5th Mar., 1903

Complete Specification Left, 19th Nov., 1903—Accepted, 31st Dec., 1903

## PROVISIONAL SPECIFICATION.

**"Improvements in Trumpets for Gramophones, Phonographs and the like"**

I, **FREDERICK CHARLES COCKMAN**, of 5 Curzon Road, Muswell Hill, in the County of London, Journalist, do hereby declare the nature of this invention to be as follows:—

- My invention relates to trumpets for gramophones, phonographs, and the like. Heretofore such trumpets have usually been made of sheet metal and they have consequently possessed very inferior resonant qualities and in most cases a very objectionable metallic sound which obscures the qualities and characteristics of the sound of the instrument or voice whose tones are being reproduced. Sometimes papier mache trumpets have been employed, but these are dull and otherwise objectionable. I have found that by making the trumpet of wood, the qualities of the tone are greatly improved, metallic noises are avoided, distinct articulation is obtained, and minute vibrations are brought out, besides which a trumpet is obtained whose qualities improve with age.
- I preferably make the trumpet from pine wood such as is used for violins, mandolins, and the like, and I find it very advantageous to cut the wood in what is technically known as "on the quarter" so that the age rings form the grain. I prefer also to reduce the thickness of the trumpet towards the large end in order to more powerfully re-inforce the vibrations of the air in the vicinity of the large end. A suitable mode of construction is to make the trumpet in sections or longitudinal taper strips glued together at their edges.

Dated this 5th day of March 1903.

D. YOUNG & Co.,  
11 & 12 Southampton Buildings, London, W.C.,  
Agents for the Applicant.

## 25 COMPLETE SPECIFICATION.

**"Improvements in Trumpets for Gramophones, Phonographs and the like."**

- I, **FREDERICK CHARLES COCKMAN**, of 5 Curzon Road, Muswell Hill, in the County of London, Journalist, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- My invention relates to trumpets primarily intended for use in connection with phonographs and gramophones, but applicable also to other sound producing instruments. Heretofore such trumpets have usually been made of sheet metal and they have consequently possessed very inferior resonant qualities and in most cases a very objectionable metallic sound which obscures the qualities and characteristics of the sound of the instrument or voice whose tones are being reproduced. Sometimes papier mache trumpets have been employed, but these are dull and otherwise objectionable. Wooden trumpets have also been used, but no attention has been paid to the construction of such trumpets

[Price 8d.]



*Cockman's Improvements in Trumpets for Gramophones, Phonographs and the like.*

to bring out the musical qualities thereof, and hence the result has not hitherto been satisfactory. I have found that by making the trumpet of wood, cut as it is technically called "on the quarter", the qualities of the tones are greatly improved, metallic noises are avoided, distinct articulation is obtained, and minute vibrations are brought out, besides which a trumpet is obtained whose qualities improve with age. This construction constitutes the novel feature of my invention. 5

I preferably make the trumpet from pine wood such as is used for violins, mandolins, and the like. In wood cut "on the quarter" that is to say, so cut that each sheet or strip radiates from the centre of the tree or log, a straight grain or reed obtains formed by the age rings which ensure perfect vibration. I prefer to reduce the thickness of the trumpet towards the large end in order to more powerfully re-inforce the vibrations of the air in the vicinity of the large end. A suitable mode of construction is to make the trumpet in sections or longitudinal taper strips glued together at their edges. 10

Referring to the accompanying drawing, Figure 1 is a longitudinal central section of a conical trumpet constructed according to my invention, and Figure 2 is a transverse section taken on the line *x, x* of Figure 1. 15

The trumpet A is made from a number of tapering strips or sections of wood *a, a* glued together at their edges. I have shown six such strips but there may be fewer or more than six. Moreover I have shown curved strips to produce a trumpet of circular section, but they may be flat, thereby producing a trumpet with any desired number of sides. The trumpet when completed is varnished with a suitable varnish which does not set too hard and so interfere with the vibrations of the wood. I prefer that the material of the trumpet shall have gradually decreasing thickness from the neck towards the large end or mouth, in order that it may act by its own vibrations to re-inforce the vibrations of the air in the vicinity of the large end. The strips of wood forming the trumpet are as before stated cut "on the quarter" and in this way the trumpet is treated like a musical instrument. 20 25 30

I do not confine myself to the use of strips of wood having straight edges as shown, as in some cases the edges may be arranged spirally or circularly around the trumpet. 35

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is: 35

1. A trumpet built up of strips of wood cut "on the quarter" so as to obtain a straight grain, for the purpose specified.
2. A phonograph, gramophone or like trumpet constructed substantially as described and shown, for the purpose specified. 40

Dated this 17th day of November, 1903.

D. YOUNG & Co.,  
11 & 12 Southampton Buildings, London, W.C.,  
Agents for the Applicant.

A.D. 1903. MARCH 5. N<sup>o</sup>. 5186.

COCKMAN'S COMPLETE SPECIFICATION.

(1 SHEET)

(2<sup>nd</sup> Edition)

Fig. 1.

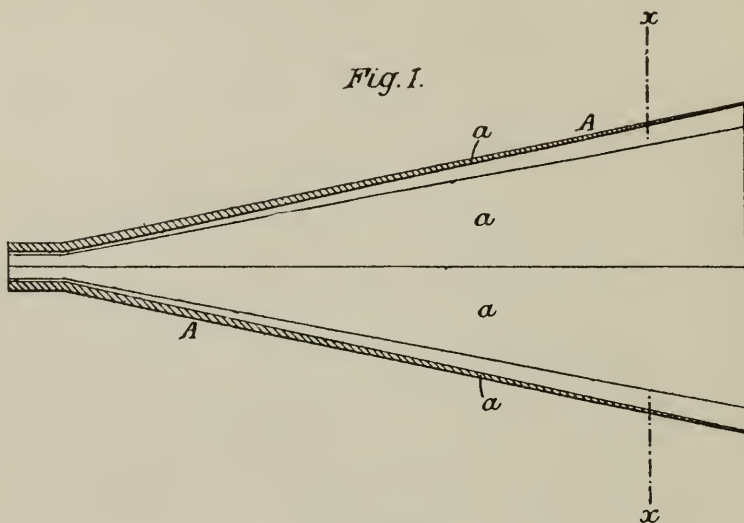
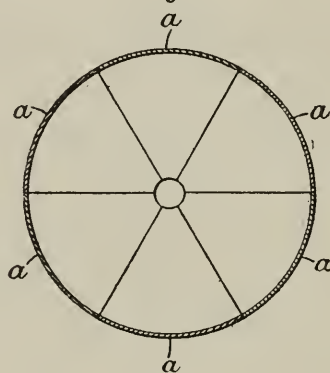


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]